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ENHANCING THE DEVELOPMENT OF GREEN PRODUCT INNOVATIONS THROUGH COLLABORATION AMONG STARTUPS AND LARGE FIRMS

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ABSTRACT

This thesis seeks to examine the phenomenon of collaborative development of green product innovations (GPI) among startups and large firms, and more precisely focuses on those Finnish firms operating towards more sustainable packaging. Awareness of plastic waste problem has forced large firms to consider more ecological alternatives for their product packaging and recently there has been invented novel green packaging innovations by Finnish startups. This creates a potential win-win situation for large firms and startups in the collaborative development of novel green innovations which has not been studied that deeply before in the scientific literature.

This research is conducting an extensive literature review on the concepts of green innovation and collaborative green product innovation among startups and large firms, taking also the nature of packaging industry into account. Based on the literature review, theoretical framework of the study is formulated to guide the empirical research. The empirical part of the study employs a research strategy of an extensive case study and data is collected through theme interviews. Three large firms and three startups participated in this research and they were selected according their contributions on collaborative green packaging innovations. The data is further analyzed by employing a theory-bonded content analysis.

The main findings of the study indicate that collaboration between startups and large firms enhance the development of green product packaging innovations because startups tend to have the novel innovations to replace plastic and big brands have the capabilities of commercializing the green innovation into an actual package for consumers. Even though large companies are also seen as innovative, the green innovations tend to come from startups where entrepreneurs' own values and interest towards green packaging drives the innovation capability. The findings show that both parties have diverse innovation capabilities that benefit in the development of novel green packaging innovations.

KEYWORDS: green innovation, green packaging innovation, startups, GPI, collaborative green product development

1. INTRODUCTION

This thesis investigates collaborative development of green product innovations (GPI) and the scope of the collaboration is limited in the relationship between startups and large companies. Moreover, especially the innovations related to product packaging are considered in this thesis. The first chapter introduces the background and motivation of the study as well as the research gap found in the previous literature. Research question and the objectives provide the purpose of the study and finally, the structure of the thesis is introduced.

1.1. Background of the study

In 2050 there are more plastics in the ocean than there are fish (Ellen Macarthur Foundation 2016). Packaging industry is using the biggest amount of plastics from all the industries (Casarejos, Bastos, Rufin & Frota 2018) and only in Finland post-consumer plastic packaging waste is 18kg/person (Dahlbo, Poliakova, Mylläri & Anderson 2018). According to a study of Ellen McArthur Foundation (2016), plastic packaging volumes are expected to increase enormously. It is assumed that in 2050 plastic packaging corresponds 318 million tonnes annually which is more than the plastic industry today. Nowadays most of the packaging materials are petroleum-based synthetic polymers, non-biodegradable and hard to recycle and reuse. Additionally, the materials are a mix of complex composites and several materials at the same time which make them almost impossible to recycle. (Casarejos et al. 2018.) According to newly published report by IPCC (2018), limiting global warming to 1.5°C requires rapid and far-reaching changes in all aspects of the society. Environmental pollution, plastic waste problem, global warming and the limited amount of natural resources highlight the need to discover new innovations to find a balance between consumption requirements and sustainability (García-Granero, Piedra-Munoz & Galdeano-Gómez 2018; WWF 2016).

The transition from the linear to the circular economy creates new opportunities for technologies and innovations to save the planet from the waste (Casarejos et al. 2018) and in society today it is not enough that companies develop innovative products, rather the products must also show improved environmental performance (Rokka & Uusitalo 2008; Sandström & Tingstöm 2008). Green innovation is defined according its "greenness" and "newness" (Wong 2013) and it refers to product or process innovation that improves product design and manufacturing process that reduce pollution, save

energy, minimize waste and decreases a company's negative environmental impact (Tang, Walsh, Lerner, Fitza & Li 2018; Dangelico & Pujari 2010). Thus, the environmental concerns generate great business opportunities in product development which in turn bring sustainable competitive advantage for the firm (Rumanti, Ari Samadhi, Wiratmadja and Reynaldo 2017; Lin & Chang 2009). Competitive advantage is being searched among green innovations in order to integrate environmental concerns into companies' strategies (De Marchi 2012) and companies that succeed in integrating green innovations in their strategies might reach and sustain competitive advantage as well (Albort-Morant, Lean-Millán & Capeda-Carrión 2018; Dangelico & Pujari 2016). According to study by Dangelico, Pujari & Pontrandolfo (2017), green product innovations are the most beneficial for a company's success besides the fact that they also have the greatest potential to benefit the natural environment.

Over the last two decades the literature indicates an increased interest in green innovation research (Tariq, Badir, Tariq & Bhutta 2017). Actually, 54% of the scientific papers related to green innovations have been published after 2010 (Bossle, Dutra de Barcellos, Vieira & Sauvée 2016). Green product and process innovation literature have evolved together with growing environmental awareness (Tariq et al. 2017) and due to increased interest towards green innovations the possibility of green product market is also assumed to increase in the future (Bossle et al. 2016). According to WWF (2016), the world is using the equivalent of 1,6 Earths to support human activities and thus, balance between consumption requirements and sustainability should be concerned more among big companies who can affect. The context of green innovations is connected to the change in the business environment and thus, dynamic capabilities are needed to survive in this new context (Laperche & Uzunidis 2012).

Companies have long been viewed as innovating internally in their laboratories and going through formal internal research and development (R&D) processes. This restricted view of innovation has been challenged by alternative paradigms which require companies to be more open to collaboration. (Goodman, Korsunova & Halme 2017.) As the business scenery is changing quickly it makes hard for big companies to innovate quick enough in order to succeed in this new context (Forbes 2018). Radical green innovation can be established in large or small firm but only few green innovations are carried out by large companies (Wagner & Llerena 2011). It is proved that startups and small scale-up companies with fewer than 50 employees are often at the forefront of the new innovations (Weiblen & Chesbrough 2015) whereas large firms might lack the innovativeness due to their emphasis on existing business (Ketchen, Ireland & Snow 2007). Thus, collaboration

with diverse partners has been examined to be ideal among development of green innovations because it broadens company's own resources and capabilities (Dangelico 2016). According to Accenture (2015), there is a significant correlation between collaboration, innovation and growth of startups and large companies. Their report reveals that collaboration among startups and large companies counts for 9 percent of large companies' total revenue and the number is expected to increase 20 percent in five years' time. (Accenture 2015.)

Moreover, there is a consensus among researchers that collaboration with external partners is significant for adoption of green product and process innovation (Melander 2017; Tariq et al. 2017). Moreover, by collaborating externally in green product innovations sustainable development can be achieved (Melander 2017). Collaborating is also seen to reduce the environmental impact of the products (Dangelico et al. 2017). Therefore, collaboration has been acknowledged to be a success factor for green product innovations (Melander 2017). In order to create green product innovations companies, need to collaborate because it enables the access to new knowledge, risk sharing and pooling resources, just to mention a few (Yarahmadi & Higgins 2012). Collaboration among companies involved in the production process of a product also enables companies to gain greater environmental improvement to reduce costs. Collaboration provides a great opportunity to join growing market for green innovations. (Melander 2017.)

This research seeks to examine the phenomenon of collaborative development of green product innovations among startups and large firms and more precisely focuses on those Finnish firms operating towards more sustainable packaging. The transition to circular economy has grown the customer interest towards sustainable packaging in consumer products (Herbes, Beuthner & Ramme 2018; Mason 2015) which in turn offers a perfect opportunity for companies to develop more environment-friendly packaging for their products (Challener 2018). Material reduction in packaging, packaging minimization and optimization, as well as the use of recycled or biodegradable materials are shaping the sustainable packaging trends at the moment. In the future packaging is also facing more stringent regulations as well as pressure from the external stakeholders. Environmental design of packaging is fast becoming a vital part of green product innovation and companies are interested in packing their products in a more sustainable way. (Dangelico & Pujari 2010.)

1.2. Research gap

Although *innovation* and *greenness* being such hot topics both in academic and practical debate it still remains unclear how these concepts are integrated into companies' activities (Bossle et al. 2016). Tariq et al. (2017) acknowledge that within green innovations there are underdeveloped and even unexplored areas whereas Kong, Feng and Ye (2016) claim that green innovation research is in its early phases and how to enhance green innovation is a scarcely understood phenomenon. Green product innovation research has rapidly grown over the last few years but still, little research has investigated the roles of dynamic capabilities and collaboration between startups and large firms in green product innovation. Previous studies in the field of collaborative GPI focus on the relations between suppliers and/or customers which creates a gap to investigate the collaboration with startups. (Melander 2017.) Already Shan, Walker and Kogut (1994) have found out that for a startup a relationship with a large firm brings advantages in the areas they are lacking resources: financial, marketing and distribution. Also, the fact that most of the novel innovations are developed by startups (Weiblen & Chesbrough 2015; Wagner & Llerena 2011) is the reason for focusing on startups as collaboration partners.

Melander (2018b) debates that no company can have all the needed knowledge for green innovations in-house and thus, to succeed in developing new green innovations it is critical to collaborate with external partners. Previous studies have highlighted the importance of collaboration with customers (Melander 2017), end-users (Zimmerling, Purtik & Welpe 2017) suppliers (Melander 2017), academic institutions (De Marchi 2012), business partners and environmental groups (Yarahmadi & Higgins 2012) but collaboration with startups seems to be lacking within the scientific research (Tariq et al. 2017). Also, according to Melander (2017) collaboration with wider range of partners, for example with startups, competitors and universities should be studied in order to expand the research within the field of collaborative GPI. In addition to this, heterogeneity between the collaborating partners fosters the evolution of exchange in a relationship (Roessl, Fink & Kraus 2010) and therefore, this study takes a closer look on the development of green product innovations between startups and large companies. More research is needed in order to comprehensively understand the role of collaboration between large firms and startups within the field of green product innovations.

Firm's resources and capabilities are relevant to the success of investment in green innovations (Díaz-García, González-Moreno & Sáez-Martínez 2015) but even though the concept of green capabilities is at some extent discussed in the previous research little

attention has been given on combining the innovation capabilities of large firms and startups. Altogether, there is a recognized need to study green product innovations in a collaboration between large firms and startups since both parties have diverse capabilities that can enhance the development of green product innovations. The focus on collaborative development of green product innovations in packaging is very rare in the previous scientific literature and thus, this study is among the first ones to take a deeper look on the topic.

1.3. Research question and objectives

Based on the recognized research gap in the field the aim of this study is to examine the importance of collaboration when developing green product innovations. The focus of this study is on the green innovations and collaboration, more precisely on the relationship between startups and large firms. In addition, the firms in this study are developing green packaging innovations together. The thesis tries not to take either side of the collaboration parties but instead considers the development of green product innovations in packaging as a core.

The main research question is following:

1) ***How collaboration between startups and large firms enhances the development of green packaging innovations?***

Three research objectives are applied in order to find the answer to the main research question. These objectives are:

2) *What are the motivators behind the interest towards green product innovations?*

3) *What motivate**s** startups and large firms to collaborate with each other within the green product innovations?*

4) *What collaboration capabilities are needed in developing green product innovations?*

1.4. Structure of the study

This thesis consists of five main chapters. The first chapter introduces the topic of the study, identifies the gap in the field as well as presents the purpose of the study including the research questions and objectives of the study. The second main chapter consists of the literature review and more specifically includes the concepts of green innovations, green product innovations, collaboration between startups and large firms as well as the combination of these concepts. In addition, packaging industry and the players in the field of sustainable and green packaging as the context of this research are discussed. In the end of the second chapter the theoretical framework of the study is formulated. The third main chapter discusses the research design and methodological choices of the study, including the research strategy and methods of the data collection and analysis. Also, the reliability and validity of the study are considered. The fourth chapter introduces the case companies of the research and analyses the empirical data in the light of the literature in this study. The fifth and the last chapter summarizes the main findings of the study and introduces the theoretical and managerial contributions of the research. In addition, the limitations of the study are discussed and the suggestions for further research are made.

2. LITERATURE REVIEW OF COLLABORATIVE GREEN PRODUCT DEVELOPMENT

This study develops a conceptual model to examine the relationship between green product innovation and collaboration capability among startups and large firms. In order to find the answers to the research question and the research objectives, the theory is divided into four parts. First, the focus is on the concept of green innovation and the growing interest on investing in green product innovations within the companies. The subject is further broadened into the collaboration possibilities within green product innovations among startups and large firms because collaborative green product innovation improves the innovation capability (Hora, Gast, Kailer, Rey-Marti & Mas-Tur 2018). Both the startups' and large firms' motivations are discussed in order to understand what kind of capabilities parties endeavor to achieve from the collaboration. Moreover, collaboration capabilities needed for successful GPI development, such as knowledge sharing, R&D collaboration and common mindset, are discussed. Last chapter of the theory introduces the emerging trends of the industry of packaging and builds the theoretical framework of the study.

2.1. Concept of green innovation

Green innovation is a broad expression. As long as characteristics *innovative novelty and value creation* as well as *resource conservation and environmental improvement* are being fulfilled, the innovation can be called as green innovation. (Song, Fisher & Kwoh 2018.) European Commission (2012: 1) describes green innovation as follows:

> *"-- any innovation resulting in significant progress towards the goal of sustainable development, by reducing the impacts of our production modes on the environment, enhancing nature's resilience to environmental pressures, or achieving a more efficient and responsible use of natural resources."*

Green innovation has three other terminologies that are used in the literature to describe innovations with a reduced negative environmental impact: "eco", "sustainable" and "environmental" (Diaz-García et al. 2015; Schiederig, Tietze & Herstatt 2012). All these terminologies examine the same topic and are synonymous, with only trivial differences in their meanings (Tariq et al. 2017). However, according to Schiederig et al. 2012, *sustainable innovation* also includes social dimension while the other meanings only implement economic and ecological aspects. The notions *green* and *eco-innovation* became increasingly used terms in scientific literature since 2005 even though the

environmental innovation was the predominant term in the beginning. (Schiederig et al. 2012.) **Table 1** describes different terms related to green innovations in order to get a deeper understanding of the terms used in the literature. This study uses *green innovation* in order to be systematic and clear.

Term	Definition
Green innovation	"as long as something possesses innovative novelty and value characteristics, and can achieve resource conservation and environmental improvement, it can be categorized as green innovation" (Song et al. 2018: 2).
Eco-innovation	"new products and processes which provide customer and business value but significantly decrease environmental impacts" (Bartlett & Trifilova 2010: 911).
Environmental innovation	"innovation that consist of new or modified processes, practices, systems and products which benefit the environment and so contribute to environmental sustainability" (Oltra & Saint Jean 2009: 567).
Sustainable innovation	"the integration of conservation and development to ensure that modifications to the planet do indeed secure the survival and well-being of all people" (IUCN 1980: 11).

Table 1. Definitions of terms related to green innovations (Modified from Schiederig et al. 2012).

Green innovations often require changes in raw-materials and components used. Also, some logistical and technical integrations as well as re-design of products are likely to happen. (De Marchi 2012.) Green innovations have several environment related

characteristics: reduced energy consumption and emissions, longer lifespans, use less hazardous materials, and are designed for easy recycling (Melander 2018a). Thus, green innovations can reduce or eliminate environmental pollution effectively through effective use of resources (Song, Fisher & Kwoh 2018; Lin & Chang 2009). However, developing a product that reduces environmental impacts is difficult and requires knowledge apart from the traditional information and skills base of the company. Still, firms are inexperienced in measuring and evaluating the real environmental performance of green product innovations. (De Marchi 2012.)

According to Fei, Wang, Yang, Chen & Zhi (2016) there are three types of green innovations: technological, institutional and business-model. Green technological innovations cover effects, such as energy conservation, emission reduction and direct improvement on environment quality whereas green institutional innovations focus more on governmental and social norms. Green business-model innovation considers the whole business life-cycle and includes *green product innovation* in the definition and because the relevance of this study, we only focus on that. In green business-model innovations, the innovation covers design, produce, supply and end-use of commercial product that is eligible to reduce the negative impact for the environment and at the same time increase the profit for the company. (Fei et al. 2016.)

2.1.1. Green product innovation

> *"Green product innovation is the production of a new product that inflicts no negative impact on the environment or less than the current or competing product" (Tang et al. 2018: 39).*

In other words, green product innovations are innovations that can reduce or prevent environmental burden and thus, avoid or reduce hazardous effects to the environment (Fadhilah & Andriyansah 2017). Today, developing green product innovations (GPI) is vital in order to generate growth in the future (Laperche & Uzunidis 2012) and green product innovation has been proven to have positive effects on environmental performance as well as organizational performance (Huang & Li 2017). Melander (2018b) states that green product innovations have lower emissions, use less energy and contain more environment-friendly materials. **Figure 1** describes the three key environmental dimensions in green product innovation: *energy, pollution* and *material* (Melander 2018b; Dangelico & Pujari 2010). Energy refers to energy efficiency in product use and that products are using renewable energy sources. Also, production phase follows energy efficient manner. Green product innovations are also preventing pollution and this aspect is considered in production processes as well. The last dimension refers

to material used. Products or packaging can be made of renewable materials or from recycled products. Biodegradable products and packaging are coming as a trend too. (Dangelico & Pujari 2010.) In addition, green product innovation takes the environmental factors into product design considerations (Chan, Yee, Dai, Lim 2016). So-called eco-design allows environmental checkpoints throughout the development process and makes sure that legal requirements are fulfilled (Sandström & Tingström 2008).

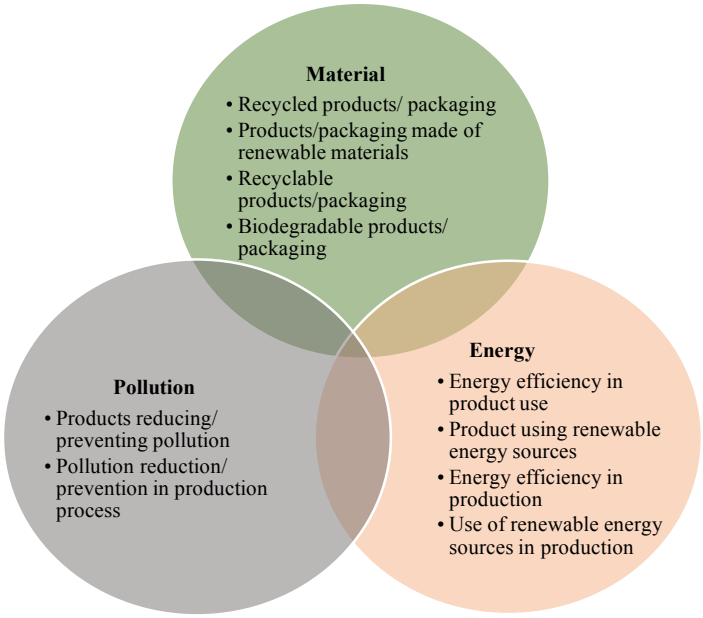

Figure 1. A framework for green product innovation (Modified from Dangelico & Pujari 2010)

2.1.2. Green product innovation capabilities

Halme and Korpela (2014) have made a clear division between company capabilities and assets. Capabilities are those that the firm *does* whereas *assets* refer to the resources firm *has*. However, it might be difficult to distinguish these two because there appears to be a slight line as to whether a certain intangible resource is an asset or a capability. (Halme & Korpela 2014.) Dynamic capabilities refer to "the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments" (Teece, Pisano & Shuen 1997). Related to dynamic capabilities, Chen and Chang (2013: 109) have defined *green dynamic capabilities* as the following:

> *"--the ability of a company to exploit its existing resources and knowledge to renew and develop its green organizational capabilities to react to the dynamic market".*

Hence, green innovation disrupts existing capabilities and requires building new ones instead of only depending on the existing capabilities (Huang & Li 2017). Dangelico et al. (2017) state that green innovation capability is firm's ability to develop products that respond to new green markets by creating product categories that answer the customer green demand. The role of capabilities is emphasized among the green innovation researchers because if a firm's desire is to create novel green innovations, new dynamic capabilities are necessary (Laperche & Uzunidis 2012). Also, so-called *eco-design capability* is highly relevant for green product innovations as companies develop products that try to reduce environmental impact through product design. Recyclability, re-manufacturability of products and minimizing manufacturing emissions are important aspects for customers when deciding which product to buy. (Dangelico et al. 2017.)

Especially dealing with technological change, the role of the development of new dynamic capabilities is essential in order to succeed in creating green product innovations (Laperche & Uzunidis 2012). Firms that are eager to develop new technologies have the biggest possibility to develop green innovations (Bossle et al. 2016) and in order to create green innovations, *green technologies* are needed to prevent the pollution by minimizing the environmental impact of the products (Song et al. 2018). Green technology is the system and technology leveraged to reduce pollution and at the same time increase the quality of environment. It is a dynamic system that includes knowledge, skills and materials and the core in green technology lies in company's capability to innovate by producing eco-friendly output. (Rumanti et al. 2017.)

2.1.3. Motivators to develop green product innovations

Green innovations are driven by external pressures but also the fact that those can lead to competitive advantage and better firm performance (Díaz-García et al. 2015). Thus, companies are putting their resources on green product innovations for a number of reasons (Melander 2017). Furthermore, the development of green product innovations is driven by internal and external factors. Internal factors include competitive advantage, cost reduction, market benefits, improved reputation and opportunities for innovation. Among external factors, the most significant are environmental regulations and market demand. (Dangelico et al. 2017.) According to Melander (2017), drivers include customer demand, economic factors, firm performance, competitiveness and regulations. In addition, increased awareness of environmental pollution and climate change are shaping the interest towards green product innovations (Huang & Li 2017; Dangelico & Pujari 2010). New opportunities in technology are also bringing new drivers for companies to

invest in green innovations and develop them (Melander 2017). Motivators to develop green product innovations are described in the **Figure 2** and then next, these factors are discussed more specifically.

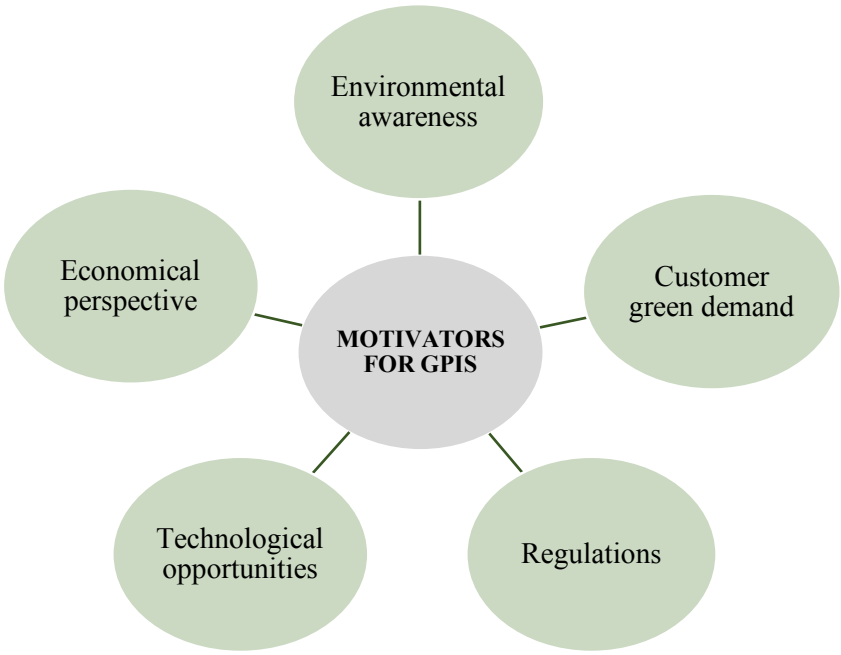

Figure 2. Motivators to develop green product innovations (based on Dangelico et al. 2017; Huan & Li 2017 and Melander 2017).

Environmental awareness

The first objective of green product innovation is to reduce the negative environmental impacts over the products' life-cycle (Chan, Yee, Dai, Lim 2016). Today green product innovation is positively associated with environmental performance (Huang & Li 2017) and thus, sustainability is more and more included in firm's strategies. Companies are more willing to put emphasis on developing new innovations that are environment-friendly and answer to environmental issues (Lin & Chang 2009) due to increased understanding of climate change and the consequences of companies' activities and attempts to be more sustainable (Díaz-García et al. 2015). In startups, entrepreneur's personal values can affect the interest towards developing green product innovations and also corporations are interested in ecological responsibility which drives GPI development (Dangelico 2016).

Furthermore, greater transparency concerning environmental actions can be achieved by investing in green innovations (Melander 2017). Dangelico (2016) adds that media is

putting more and more attention on environmental impact of companies' activities and therefore, innovation can bring branding advantage as well (Wong 2013). By developing green product innovations, companies can enhance their corporate reputation and image to become more environment-friendly (Cai & Li 2018; Melander 2017; Rumanti et al. 2017; Dangelico 2016). Pacheco, Caten, Jung, Navas and Cruz-Machado (2018) agrees on this and state that reputation and desired brand image can be achieved by investing in green innovations. However, green products cannot sustain permanent success unless they can demonstrate impressive environmental performance and still maintain functional benefits of the product (Dangelico & Pujari 2010). Usually novel green products also replace existing products thereby reducing adverse environmental impacts (Dangelico 2016).

Customer green demand

Nowadays, customers are environmentally conscious and "buying green" is becoming a trend. Thus, a green product is a value-adder but also the most critical determinant for customers when making purchasing decisions. (Wong 2013.) Mason (2015) agrees on this and claims that more than ever before consumers want to buy products that reflect a comprehensive consciousness to the environment. Greater customer satisfaction can be achieved through fulfilling customers wishes of product "greenness" and "newness" (Wong 2012). Customer green demand is an important motivational factor to create green product innovations (Cai & Li 2018; Dangelico 2016) and companies should be interested in customers' market voice in order to set their innovation strategies (Dangelico 2016).

This leads to the situation where companies must innovate and respond to changes in consumer's demand and lifestyles in order to maintain their market position (Bossle et al. 2016). By informing consumers about the environmental quality of their products it will attract customers to buy the products in the era of sustainability because consumers have a growing interest in preventing climate change. (Dangelico 2016.) According to Wong (2012), green product innovations have the possibility to gain extensive superiority over the competitors in terms of product functionality and quality. This in turn, is a great motivator for companies to provide its customers greener products. (Wong 2012.) Market demand and market stakeholder pressure is bent to greener options (Dangelico 2016) and today companies can easily be very close to customers' opinions, needs and wishes, for example through social media. According to Cai and Li (2018), competitive pressure is the greatest incentive to develop novel green innovations. Also, Melander (2017) mentions market pressure through competition as one motivational factor towards developing green product innovations.

Regulations

Even though interest towards sustainable goals and green innovations have grown among companies, motivation is still very much oriented towards compliance with standards (Bossle et al. 2016) and thus, regulations are motivators for companies to innovate green (Melander 2017; Dangelico 2016). Concerns about public image of the company or fear of penalties set companies to innovate green (García-Granero et al. 2018; Yarahmadi & Higgins 2012). Lot of regulations are set towards emissions and clean production costs in order to reduce environmental pollutions. Thus, green product innovation process requires firms to consider their clean production costs and emissions in order to comply with the requirements. Investments are being made to minimize production waste so as to avoid punishments from government regulators but also to protect environment. (Huang & Li 2017.) Furthermore, Cai & Li (2018) acknowledge that innovating green reduces pollution penalty costs when the innovation process meets environmental regulations.

Regulations can be implemented aimed directly or indirectly at the customer. Indirectly means that the regulations are set at producer via its customers. Extended producer responsibility (EPR) is an environmental policy approach in which the producer's responsibility is extended to the post-consumer stage of a product's life-cycle. This encourage companies to develop products that are easy to recycle after use. (Melander 2017.) In addition, companies are being set green regulations to satisfy and attract customers but often it is forgotten that those expectations can also be exceeded which brings new competitive advantage for the companies (Melander 2018a). Dangelico (2016) reminds that even though new environmental regulations towards GPI's are set, companies should see them as an opportunity to innovate rather than as limitations.

Technological opportunities

The present state of technology might set limitations for the development of new innovations (Schiederig et al. 2012) but as new technologies and materials come available the field of green innovations will evolve (Melander 2017). Increased understanding of climate change and pressure on transparency concerning environmental actions address companies to invest in technological development of R&D (Dangelico 2016). Melander states that as technology will improve, also new materials that are more environmental-friendly will become available. These materials can contribute the technology that reduce the use of energy and CO_2 emissions or is based on pollution-prevention technologies (Melander 2018a). Dangelico (2016) reminds that technological opportunities are external drivers of GPI and activities are often conducted outside the company.

Economical perspective

Innovations enhance economic growth directly but simultaneously growth is associated with environmental damage (Bossle et al. 2016). However, already Porter and Van der Linde (1995) found the positive correlation between adoption of green innovations and economic performance; green innovations open up opportunities to enter new markets and become market leader which is linked to economic advantages but at the same time good for the world. This is based on two facts. First, customers are more willing to pay higher price from the green products. This creates a market niche for a company creating green product innovations and also boosts firm's business opportunities for more environment-friendly operations. Second, cost of green innovation is reduced due to interest in green products. Customer perceptions of novel green products is high due to complexity and uncertainty of these products. (Cai & Li 2018.) Wong (2013) adds that consumers are also more willing to spend a little more if they know that their purchase will protect environment. Thus, green product innovations may enhance the economic performance of the companies through increased sales and entering into new markets (Melander 2017). Lee & Min (2015) add that green research and development are positively affecting on financial performance of the firm.

However, there are some empirical research that does not support the positive link between green innovations and increased financial performance. Aguilera-Caracuel and Ortiz-de-Mandojana (2013) state that in comparison to non-green innovative firms, green innovative firms do not experience improved financial performance. Still, they also admit that intensity of green innovation is positively related to firm profitability. According to Driessen, Hillebrand, Kok and Verhallen (2013), green product innovation is associated with low financial performance.

Despite these dissenting results of the link between positive economic performance and green product innovations, most of the researchers acknowledge the link to be positive (Cai & Li 2018; Melander 2017; Dangelico 2016; Lee & Min 2015). Dangelico (2016) highlights the competitive advantage reached through developing green product innovations. By investing in green product innovations, firms can have cost savings, achieve competitive advantage, increase their market share and sales, increase the overall turnover, get higher profits and better reputations, increase their export and aim higher in productivity. (Dangelico et al. 2017.) Thus, it has been noticed that green innovations have an indirect positive impact on firm's economic performance (Cai & Li 2018). Altogether, company's desire to innovate green products is driven by many motivational

factors. However, in order to develop green products, green product innovation capabilities are needed. Those will be discussed next.

2.2. Collaborative green product innovation

Melander (2018a) states that in green collaborative innovation efforts, companies integrate knowledge from different sources and link them. Companies collaborate in green product innovation in order to develop products with less environmental impact (Melander 2018b). However, too few resources are limiting companies to invest in research and development units and thus, green technologies cannot evolve only inhouse (Fernando, Wah, Shaharudin 2016) rather, in a complex process of collaboration (Laperche & Uzinidis 2012). Collaboration is seen as a success factor for GPI (Melander 2018a) but as well are resources and capabilities (Dangelico 2016). Creating green product innovations often require knowledge and contacts beyond the boundaries of one organization which urges firms to collaborate with external stakeholders (Goorman et al. 2017).

In collaborative product innovation companies develop together new products. External collaborations in product innovation processes are acknowledged to enhance the likelihood of companies creating new products. (Melander 2017; Petruzelli et al. 2011.) Actually, collaboration plays more important role in green product innovation than in other types of innovation (Huang & Li 2017; Petruzelli, Dangelico, Rotolo & Albino 2011) and it is acknowledged that environmental innovative companies are more likely to collaborate on innovations with external partners than just innovative firms because they understand that collaborative R&D is a significant factor when developing novel green product innovations (Huang & Li 2017).

Effective collaboration with people from different backgrounds and functional areas enhance the innovation success (Huang & Li 2017). Roessl et al. (2010) highlight the importance on establishing collaborations with heterogeneous partners because it embraces the versatility of exchange between partners. Collaborations with diverse partners than the company assure better results in novel innovations and thus, asymmetric relationships are recommended in order to increase the benefits of the collaboration. (Melander 2017.) Partnership, where the partners differ in size, have dissimilar resources or commercial experience, is called as *asymmetric relationship* (Minshall et al. 2010). Asymmetrical dependencies appear when there are differing balances of the incentives

and the contributions to be made among the collaboration partners (Roessl et al. 2010). It is acknowledged that an asymmetric partnership between technology-oriented startup and large firm is a perfect fit for implementing a novel innovation (Minshall et al. 2010). Next, both startup and large firm perspective is considered when examining the resources and combinations of resources that motivate startups and large firms to collaborate with each other in the field of GPI. First, the definition of a startup is provided in order to get an understanding how the term is seen in this thesis.

There are various definitions for *a startup* and there is no perfect definition for the term. The most commonly used is that a startup is a newly established small company, but this kind of definition is very narrow and doesn't give a broad picture of startup as a phenomenon. (Ries 2016.) If any small newly established company is a startup what is the fuss around the phenomenon? Ries (2016: 47) defines startup as follows:

> *"Startup is a human institution which is established to create new product or service in extreme uncertain circumstances."*

This definition, on the other hand, doesn't cover the smallness or novelty of a startup and according to Ries (2016: 47) the size of a company is purposely excluded from the definition. In this thesis the combination of these two definitions define best how startup is considered. Therefore, startup in this research means human and newly established small company which is established for creating new products in uncertain circumstances. Startup is considered to be human because startup is not only product, technological breakthrough nor novel idea – but also finding right people and developing an innovative company culture. These characteristics brings the humanity to the definition of a startup. (Ries 2016: 47-48.) Moreover, typical characteristics of a startups include idea generator, organizational agility, the willingness to take risk, and aspirations of rapid growth (Weiblen & Chesbrough 2015).

2.2.1. Startup's motivation to collaborate with a large firm

Halme & Korpela (2014) have investigated whether the lack of resources prevent green innovations in small firms. The results show that it is possible to create green innovations from scarce resources if the company collaborates (Halme & Korpela 2014). Asymmetric partnership between a large company and a startup enlarges startup's resource base (Hora et al. 2018) and thus, bigger production resources attract startups to seek innovation partners among larger companies. Startups tend to be flexible to explore new technologies and build a creative business models to support them. (Hogenhuis et al. 2016.) Moreover, large firms are potential collaboration partners for startups because they have the power

of making startups' innovative technologies accessible (Hora et al. 2018; Hogenhuis et al. 2016; Weiblen & Chesbrough 2015) because large companies have the needed resources and experience that startups are lacking (Hora et al. 2018).

Asymmetric partnership between a large company and a startup enlarges startups' resource base and sales network which in turn leads to time and cost advantages (Hora et al. 2018). Large firms typically have previous experience in commercialization processes and by collaborating with large firms, startups can release more attention on research and development activities. Startups are able to focus more intensely on product development and thus, the probability of achieving innovation goals is increased. (Shan et al. 1994.) Moreover, experienced companies can help startups to sell products faster and thus, provide stable sales which are atypical for startups due to their agile business. Moreover, through collaboration with large firms, startups will have more time for other business activities as long as they don't need to do everything by themselves. (Weiblen & Chesbrough 2015.)

Startups can also internationalize their sales activities more easily with the support of a large firm (Hora et al. 2018) and according to Fernando et al. (2016) collaboration with external partner will help improve product marketability and design of the green products. Large corporations have experience in branding and access to markets which attract startups to seek innovation partners among larger companies (Hogenhuis et al. 2016). Moreover, bigger companies are more capable of making green product innovations into market success because they have much broader market reach than startups (Dangelico 2017 et al.) and experience in commercialization process (Shan et al. 1994). In addition, Usman & Vanhaverbeke (2017) mention the reputational benefits of the collaboration with a big actor in the market; the positive reputation can be an advantage for future endeavors.

Altogether, the most relevant factor to collaborate with a large firm is corporates' financial and social resources because in order to develop green product innovations these resources are needed (Hora et al. 2018). However, it is important to notice that for a startup a green innovation can be their main product (Halme & Korpela 2014) and thus, it is vital to investigate what resources and combinations of resources startups need from collaboration with large companies. In a relationship between a startup and a large firm the latter has the power. In order to find a perfect match for collaboration large corporations need to put efforts on convincing startups of their credibility and avoiding misuse of their power. (Weiblen & Chesbrough 2015.) Usman and Vanhaverbeke (2017)

remind that if a startup is a technology provider in the collaboration relationship with a large firm it is important to negotiate skillfully the collaborative agreement as there is the possibility that large firm will no longer need the startup for its technology after a couple of years.

2.2.2. Large firm's motivation to collaborate with a startup

Instead of viewing startups as innovation creators, companies are eager to collaborate with them in order to become more entrepreneurial (Weiblen & Chesbrough 2015). Startups are mostly seen as innovate partners (Hogenhuis et al. 2016) and because large firms are seeking for ways to become more entrepreneurial, they collaborate with startups. Large firms have noticed the startups' capability for creativeness, and they want to transform startups into engines of corporate innovations. (Weiblen & Chesbrough 2015.) Green innovations are seen as important strategic tools among management because high-tech firms can bring sustainable development into product development (Chen 2008) and startups most often have the desired technology (Weiblen & Chesbrough 2015).

In addition, the style of working in a startup is often opportunity-driven which allows them to approach projects in a creative way. Large firms are normally driven by strategy which force them to act more accurately according to the plan. (Hogenhuis et al. 2016.) In that case, large firms don't have the ability to continuously seek for new opportunities. Long-established firms might be looking for improving their innovation capability and for that startups can assure a great source of innovation. (Minshall et al. 2010.) Thus, it is argued that collaborative innovation enables large companies to exploit their advantage-creating skills and at the same time outsourcing opportunities outside their domain (Ketchen et al. 2007).

It is also argued that the role of startups is most valued in the front-end of innovation process because they have the creativeness which supports the elaboration of ideas and the conceptualization of the potential innovations (Hogenhuis et al. 2016). According to Hogenhuis et al. (2016) large firms often imagine that startups are skilled through the whole innovation process. However, in most cases the innovativeness of a startup is best leveraged in the early stages of the innovation process (Hogenhuis et al. 2016). One reason for this can be the fact that startups tend to have organizational agility and are usually eager to take risks in order to achieve rapid growth quickly (Hora et al. 2018; Weiblen & Chesbrough 2015) whereas bigger companies are normally less ambitious in their environmental goals (Dangelico et al. 2017).

Startups are typically seen as knowledge leaders and collaboration with knowledge leaders is recommended because it helps companies to acquire rare resources and capabilities. Startups are eager to test innovations in areas which large firms cannot or would not want to engage themselves and thus, collaborating with startups enlarges possibilities for a large firm. For a large firm there might be obstacles to test innovations or operate in some markets due to longer development processes and agile startups can provide several advantages for entering new market areas. (Hora et al. 2018.) R&D initiatives with collaboration partners also give different technical qualities to introduce novel products. Sources of new innovative ideas help firms to gain competitive advantage and thus, collaboration with knowledge leaders is desirable. (Yarahmadi & Higgins 2012.)

Altogether, through collaborating with startups large firms are enabled to improve their innovation capabilities because startups provide the technology and knowledge base capabilities that are missing from corporations (Hora et al. 2018).

2.2.3. Organizational advantages of a collaboration

A startup and a large firm have many supplementary innovation capabilities that will enhance the development of green product innovations and collaboration between large firms and startups should be considered as a dynamic relationship because the strategic positions and needs develop over time. Also, the network formation with other partners evolves. (Usman &Vanhaverbeke 2017.) Cooper's generic Stage-Gate model (1990) identifies five key innovation capabilities that are needed in the innovation process: *creativity, innovative technology know-how, problem-solving skills, project management* and *manufacturing capability*. By combining innovativeness of startups and the resources of large firms, collaborative development of green product innovations is enhanced (Dangelico 2016). Bos-Brouwers (2010) highlight that it is not important to specify whether small or large firms are more innovative, rather the key lies in understanding that small firms innovate differently than large companies and typically startups have behavioral advantages and resource disadvantages in innovation. (Bos-Brouwers 2010.) The **Table 2** below summarizes the advantages startups and large firms have for innovation creation and then the next chapter will discuss about the collaboration capabilities needed for successful GPI development.

STARTUPS ADVANTAGES	LARGE FIRM'S ADVANTAGES
Flexibility of organization • less bureaucratic • responsiveness to changing circumstances • internal communications faster and more efficient **Owner / Manager** • dynamic, entrepreneurial • horizontal leadership style • direct role in innovation as idea generator	**Financial** • less difficulties attracting venture capital and investments • innovation risks averted by diversity in production, sales and innovation projects **Labor** • less difficulties in attracting skilled labor **Knowledge** • participation in networks (technological knowledge) • information management systems **Management** • decentralized management style with decision power on lower levels in the organization • long-term strategic management capabilities

Table 2: Innovation capabilities of startups and large firms (Bos-Brouwers 2010)

2.3. Collaboration capabilities for development of green product innovations

As acknowledged in the previous sub-chapters, firms need to explore new solutions related to green innovation capability from external actors because their own functions and skills are not enough when developing radical and novel green product innovations (Hora et al. 2018; Dangelico et al. 2017; Huang & Li 2017; Bos-Brouwers 2010). However, establishing an efficient collaboration between a startup and a large firm can be difficult due to organizational differences between the companies (Roessl et al. 2010). Also, Weiblen and Chesbrough (2015) admit that in green product innovations combining entrepreneurial activity and corporate ability sounds like a perfect match but can be hard to accomplish. Large corporations might be hard to approach for startups even though nowadays there seems to be an increased amount of corporate efforts towards startup ecosystem (Weiblen & Chesbrough 2015).

In addition, different management styles and dissimilar cultures can cause challenges in a collaboration relationship between a startup and a large firm (Roessl et al. 2010). Weiblen and Chesbrough (2015) notice that cultural dissimilarities often lead to misunderstandings. Large firms usually have larger scope of activities in comparison to startups and thus, large firms are less dependent on the contributions of the startups. For a startup it might be difficult to find alternative resources by its own and its ability to create these resources is also limited. However, without a startup large firm can still produce needed resources internally or find them from other sources. This creates power to the side of a large firm, and it is argued that the party who has the dependency (large firm) is more likely to receive more profit from the collaboration. (Roessl et al. 2010.) On the other hand, Shan et al. (1994) see that if cooperation enhances startup innovation large and small firms can be seen as mutually dependent.

Therefore, capabilities to collaborate with external partners are in central when developing new green product innovations (Laperche & Uzunidis 2012) and the more actors there are involved in R&D collaboration, the increased is the amount of green product innovations. Thus, external collaborations are vital and also important sources of innovation. (Melander 2017.) Collaboration capability refers to the involvement of individuals and other firm resources in order to better exploit distributed knowledge and expertise. Collaboration facilitates integration and combination of knowledge, competency and technology across partners involved in collaboration relationship. (Huang & Li 2017.) Dangelico (2016: 568) summarizes this as follows:

> *"A firm's ability to integrate, coordinate, build and reconfigure its competences and resources to accomplish environmental innovations -- are important antecedents of GPI"*

As Dangelico (2016) states above, knowledge sharing, R&D collaboration and sharing common mindset of the project play a huge role in collaborative development of green product innovations and are thus collaboration capabilities that are needed in the successful GPI development. These will be discussed next.

2.3.1. Green knowledge sharing

Knowledge capital refers to set of information, knowledge and know-how produced, acquired, combined and systematized by the company in order to create value. It can be seen as a dynamic capability and thus, an important tool to achieve change. (Laperche & Uzunidis 2012). Knowledge sharing is acknowledged to be vital for innovations in general (Ben Arfi, Hikkerova & Sahut 2018) and Lin & Chen (2017) have recently

defined term of *green knowledge sharing* which suits perfectly to this thesis. By developing green knowledge sharing, firms can better gain innovative skills and knowledge to create green product innovations. (Lin & Chen 2017.) The trajectory to be greener might be expensive and risky for companies and consequently, knowledge sharing, and knowledge transfer play vital role. (Laperche & Uzunidis 2012.) Sandström and Tingström (2008) add that when skills and expertise from different fields are combined, the new knowledge for green product innovations is enhanced.

According to Dangelico (2016) and Sandström & Tingström (2008), creating and fostering networks of collaboration as well as allowing the exchange of knowledge, both within and outside the firm, are important for GPI development. Rumanti et al. (2017) agrees on this by arguing that innovation process requires new knowledge and therefore, knowledge sharing between individuals within the company and between involving stakeholders is essential. Especially external collaborations will broaden firm's technology base and access to environment-friendly materials and designs (Melander 2018a). Moreover, according to Lin and Chen (2017) knowledge sharing improves green dynamic capacities and is thus very relevant factor when thinking of the collaboration capabilities needed in successful creation of green product innovations among startups and large firms.

Nevertheless, knowledge transfer does not happen automatically but instead it requires a high level of knowledge sharing. Companies aiming at long-term benefits, such as higher innovation performance and profit, should consider sharing knowledge. Especially knowledge sharing based on trust, respect and mutuality lead to better results. (Wang & Hu 2018.) Also, Melander (2018b) highlights the importance of combining capabilities, such as trust, in collaborative innovations. Ben Arfi et al. (2018) reminds that the success of green innovations lies on how external knowledge is transformed into internal skills. Regular communication and mutual knowledge transfer are acknowledged to ensure that both the startup and the large firm can equally benefit from the collaboration (Hora et al. 2018).

Huang & Li (2017) underline the availability of valuable knowledge flow between partners in relation to the development of green innovation but still, startups are afraid of losing their ideas for big companies (Hora et al. 2018; Weiblen & Chesbrough 2015). Firms might be unwilling to share all the detailed information with other firms if the knowledge is a proprietary advantage around green innovation (Huang & Li 2017). Melander suggest investing in a relationship because when the relationship is deep,

parties are more willing to share their knowledge. Yet, the core of strategic partnership is to jointly explore new opportunities for improvements in green product innovation (Huang & Li 2017) and companies can only manage knowledge productively if partners are willing to share their knowledge. Thus, firms are more capable of generating new ideas for developing innovation activities if knowledge sharing is smooth and open between the employees. (Ben Arfi et al. 2018.)

2.3.2. Green research and development collaboration

Firms' investments in research and development (R&D) are vital in order to create green innovations (Lee & Min 2015). Especially R&D collaboration is essential in developing new technological capabilities for green product innovations (De Marchi 2012) and related to this it is proved that firms in high-tech industries develop a better green innovation capability because they invest more in R&D (Dangelico et al. 2017). In addition, collaborative innovation can stimulate mutual creativity of the collaborating partners (Wang & Hu 2018) and because startups tend to be more innovative (Hogenhuis et al. 2016), large firms may become more entrepreneurial (and thus innovative) through collaboration (Weiblen & Chesbrough 2015). However, collaborative innovation process needs two-way communication inside the collaborative R&D team (Wang & Hu 2018).

Green innovations demand high R&D knowledge and therefore, collaboration with external partners outside the firm are proved to be valuable. Especially, when the knowledge and skills are not typical specialties of the company. (De Marchi 2012.) Also, Halme and Korpela (2014) acknowledge that the lack of resources can be patched up with active R&D collaborations with relevant stakeholders. Also, a desired level of innovation is easier to accomplish if the knowledge is shared fully (Wang & Hu 2018). When developing green product innovations together a geographical proximity can be a huge advantage because knowledge exchanges are often made immediately at the production sites (Hora et al. 2018). Also, communication directly is possible among startups and large firms when both parties work in the same place (Hora et al. 2018). In addition, companies with high levels of collaborative innovation capabilities tend to integrate more new knowledge from other firms in order to facilitate their own innovative activities (Wang & Hu 2018).

Furthermore, Sandström and Tingström (2008) remind that failure and mistakes in the green product development process should be accepted. Small and large errors are natural part of the development process and accepting the possibility for mistakes early on the

R&D process, encourages participants to be creative and innovative. (Sandström & Tingström 2008.)

2.3.3. Common mindset of the project

Related to flowing R&D collaboration, considering and communicating environmental aspects already from the start of the process is vital (Dangelico 2016; Sandström & Tingström 2008) because the basis of a collaboration lies in sharing a common mindset and vision of the mutual project (Hora et al. 2018; Usman & Vanhaverberke 2017). On the other hand, effective groundwork before the development process enables screening of prototypes of the products, the purpose of the processes and overall business analysis. (Dangelico 2016.) According to Sandström & Tingström (2008), in order to create environmentally-friendly products, setting challenging environmental targets and rewarding environmental improvements are crucial in the beginning of the collaboration. Therefore, it is essential to define objects and milestones of the project before the collaboration starts (Hora et al. 2018).

It has been acknowledged that in many cases, the collaboration among startups and large firms end up nowhere because there have been unarticulated differences in goals and business processes (Usman & Vanhaverbeke 2017). Melander (2018a) adds that by sharing objectives for green innovation, parties will likely avoid misunderstandings. Melander (2018a) reminds of contractual arrangements in early stages of collaboration. Even though it might be difficult to define the outcome of certain technology or a new product, the clear contract of responsibilities and patent issues commit partners to the collaboration relationship (Melander 2018a).

Development of GPI also includes market orientation which refers to establishing specific target market for greener products and taking market needs into considerations (Dangelico 2016). Thus, the successful development of GPI is possible through the commitment of top management and taking the environmental aspects into account already from the start of the process (Dangelico 2016; Sandström & Tingström 2008). Therefore, managing external coordination and building an effective communication with partners is a prerequisite for a successful collaboration (Melander 2018a). Moreover, Usman & Vanhaverbeke (2017) debates that startup managers who have previous experience from working in a large corporation have a considerable advantage since it gives insight into the processes and practices of a large company. This enables managers to negotiate with an efficient way. (Usman & Vanhaverbeke 2017.)

2.4. Current trends of green packaging industry

This research examines the phenomenon of collaborative development of green product innovations among startups and large firms and focuses especially on those Finnish firms that are operating towards more ecological packaging. Therefore, it is essential to go through the emerging trends in the industry of packaging because the trends are also shaping the motivations towards creating green product innovations among companies. Green packaging refers to packaging that can be reused, recycled or degradation and does not cause pollution in humans and the environment during the product life cycle (Zhang & Zhao 2012). Zhang and Zhao (2012: 902) describe green packaging as follows:

> *"—environmentally friendly package, which is completely made by natural plants, can be circle or second use, be prone to degradation promote sustainable development, even during its whole lifecycle, it is hurtless to environment as well as to human body and livestock's health."*

Hence, green packaging initiatives include the use of recycled materials, or natural and biodegradable materials (Dangelico & Pujari 2010) and it is acknowledged that compostable packaging materials are a key when solving issues related to disposable packaging and waste management problems. From the urban solid waste generation, packaging waste represents the major part of it. (Casarejos et al. 2018.) Because plastic waste flow is dominated by the packaging, in the newest literature of waste managements, also recycling is a hot topic. Especially recycling plastics is urgent in order to maintain natural resources and by the concerns of packaging plastics in oceans and lakes. (Dahlbo et al. 2018.) Material reduction in packaging, packaging minimization and optimization, as well as the use of recycled or biodegradable materials are shaping the sustainable packaging trends at the moment (Dangelico & Pujari 2010).

Moreover, packaging is often seen as a burden for the environment but still, the main task of the packaging is to protect the product (Grönman, Soukka, Järvi-Kääriäinen, Katajajuuri, Kuisma, Koivupuro, Ollila, Pitkänen, Miettinen, Silvenius, Thun, Wessman & Linnanen 2013). Mason (2014) agrees on this and states that the packaging needs to meet the product performance requirements. Otherwise, packaging and the product will likely end up as waste. (Mason 2014.) Safe package is significant especially in food packaging because it should reach the consumer in good condition which in turn prevent food losses (Grönman et al. 2013). Therefore, product packaging should be equipped with both the basic function of conventional packaging as well as the angle of environmental protection (Hao, Liu, Chen, Sha, Ji and Fan 2019).

Product packaging is for protecting and preserving its content, but the packaging also conveys messages about the manufacturer (Challener 2018; Grönman et al. 2013). Companies are interested in building a green image for their brand. In packaging, there are many ways to promote the greenness: the packaging can be biodegradable, composted, or it can be refilled or reused (Doyle 2012). By integrating green concept into the product packaging, companies can improve their product quality and increase their differentiation advantages associated with their products (Huang & Li 2017; Chen 2008). Packaging is an extension of a company's brand and it is argued to reflect company's market position as well as its philosophy. If a product has an environmentally friendly packaging it is said that the company is trendy, innovative and responsible. (Mason 2014.)

In addition to brand image through green packaging, packaging is also facing more stringent regulations in the future (Dangelico & Pujari 2010). However, new environmental regulations also act as incentives for companies to make their products and packaging greener (Dangelico 2016). According to Hao et al. (2019), legislation is a key in promoting the utilization and popularization of green packaging. Moreover, environment-friendly consumption habits are most likely to grow if regulations are set for the companies. (Hao et al. 2019.)

2.4.1. Consumer awareness in packaging

Mitchell, Topić & Munroe (2018) debate that understanding the attitudes, perceptions, and behavior of consumers is important when defining the future of product packaging. For example, according to their study, there are strong negative perceptions around plastics as packaging material among consumers. The greater awareness of ocean plastic pollution impacts on the attitude of the consumers towards packaging material. (Mitchell et al. 2018.) Also, Rokka and Uusitalo (2008) claim that environmental packaging can have a positive impact on consumer choice. According to Herbes et al. (2018) consumers tend to emphasize on end-of-life concerns of products (e.g. reusability, recyclability and biodegradability) instead of beginning-of-life concerns (e.g. material choice). Consumers are becoming more aware of the product ingredients and especially more vocal about their support for the use of natural ingredients. In addition to this, they also expect the packaging of the products to be eco-friendly. It is already acknowledged that particularly beauty companies are becoming under increasing pressure to be sustainable and develop green packaging for their products. (Mason 2013.)

Mason (2013) states that consumers are willing to pay higher price for the product if their intention is to find brands with values that match their own. Also, according to study by Mitchell et al. (2018), consumers are willing to pay more for a packaging they know is more ecological. However, it is well acknowledged among researchers (Mitchell et al. 2018; Mason 2013) that even though consumers want more environment-friendly packaging they are not yet ready to pay lot extra of it. Ecological packaging is ideal according to consumers, but not if it affects the price, quality or convenience of the product itself. Thus, there lies a gap between thought and action of consumers. (Mason 2013.) In addition, Hao et al. (2019) have investigated what factors affect consumer's willingness to pay for greener packaging. Those factors include environment, green packaging quality, commodity, and package price. From these, environment factor being the most relevant one. (Hao et al. 2019.) Furthermore, Rokka & Uusitalo (2008) have investigated of consumer behavior and their study shows that there is a specific segment for those customers who tend to choose green packaging instead of traditional one.

At the moment, the current trends in green packaging concerns food packaging (Grönman 2013) and cosmetics packaging (Mason 2015; Doyle 2012). The scene of green packaging is still very young in the scientific literature because green innovations in packaging are still very rare, at least in Finland where this study was conducted. However, according to study by Hao et al. (2019), consumers are optimistic about the development of green packaging innovations and have a great confidence in its future. Doyle (2012) even states that Finland, among other European countries, has "eco-conscious behavior" which is tied into the culture and thus, consumers are expecting products that are environment-friendly.

2.4.2. Theoretical framework of the study

In this chapter, the theoretical framework of the study is built based on the extensive literature review conducted. The aim of this thesis is to find an answer to the main research question of how collaboration between startups and large firms enhances the development of green packaging innovations. The concept of *green product innovations* (Hora et al. 2018; Dangelico et al. 2017; Huang & Li 2017 Melander 2017) is combined with the *collaborative relationship between startups and large firms* (Hogenhuis et al. 2016; Minshall et al. 2010) where both have essential *capabilities for the successful creation of novel green innovations* (Melander 2018b; Dangelico et al 2017; Lin & Chen 2017). This box is described in the middle of the framework because the collaborative green product innovation is in the core in this thesis. Startups, large firms and their

capabilities are connected in the framework with the collaboration capabilities needed for the successful development of green product innovations. Green knowledge sharing, green R&D collaboration and common mindset are the most important factors for building a relationship that is opportune for creation of collaborative green product innovation and thus, these collaboration capabilities are in the middle of the box.

Uppermost box of *motivational factors for GPI's* describes reasons why companies have started to think about green product innovations. These factors have been identified from the previous literature as main motivators that push companies to innovate green products. *The current trends of packaging,* on the other hand, are also motivators for companies to innovate green, but these two boxes are separated because the lowest box only focuses on those factors that emerge from the literature of packaging whereas the uppermost box describes the motivational factors only for green product innovations. For the connection of these two boxes, there is drawn an arrow from motivational factors to the trends in packaging.

Furthermore, the boxes of *current trends of packaging* together with *motivational factors for GPI's* are outside of the main box of *collaborative green product innovation* because the two aforesaid are central motivators for companies to innovate green product packaging for their existing products and are thus "pushes" to collaborative green product innovation. In addition, the box of current trends of packaging could be changed in other circumstances to another upcoming trend if the framework is wanted to utilize differently. **The Figure 3** in the next page presents the theoretical framework of this study.

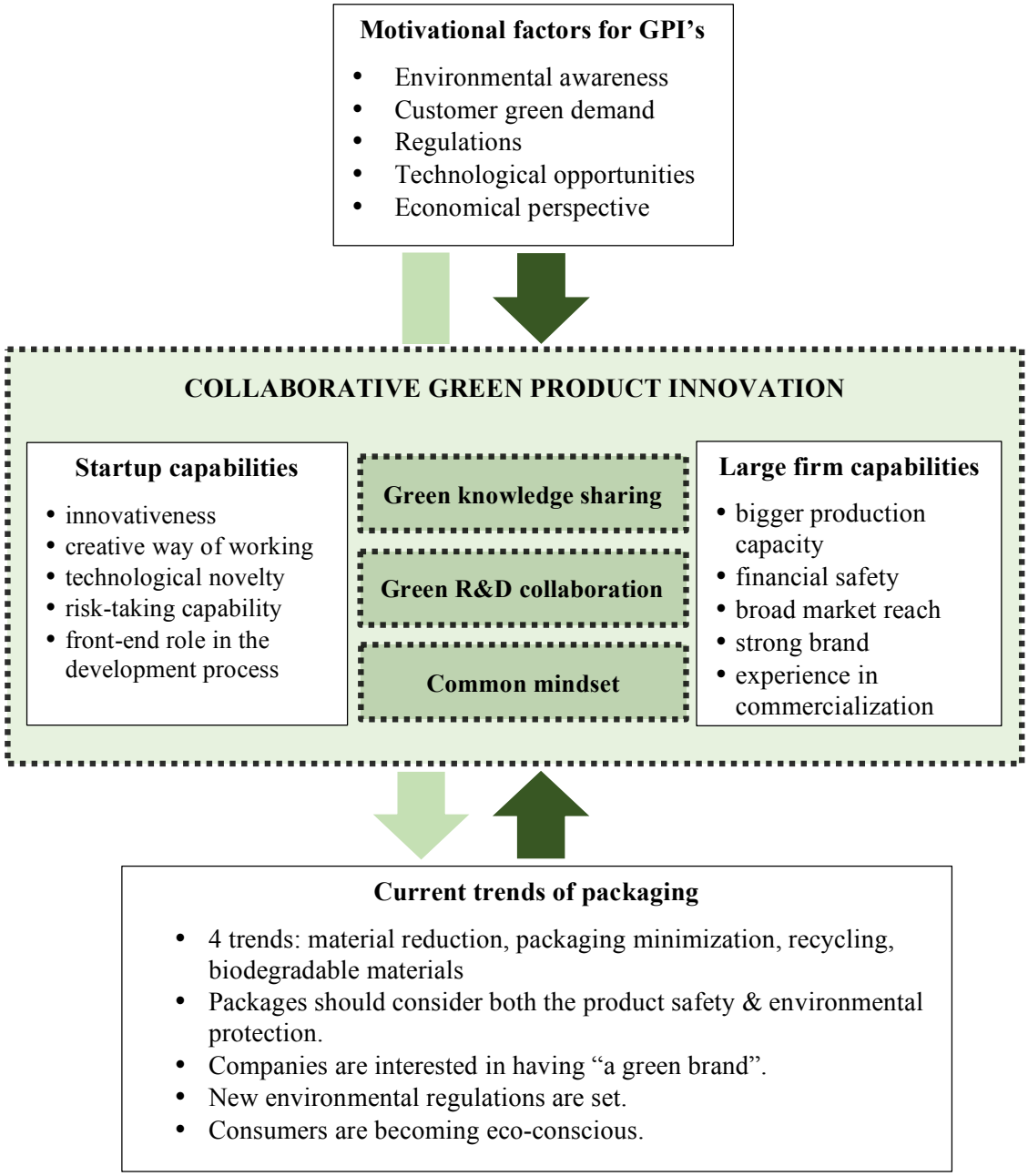

Figure 3. Theoretical framework of the study

3. RESEARCH DESIGN AND METHODOLOGY

This chapter focuses on the methodological choices of the study. Methodology examines why certain method for data collection is used and why the data is analyzed in a certain manner (Tuomi & Sarajärvi 2009: 13). Therefore, the research methodology and methods for data collection and analysis based on the purpose of the research and research questions are presented and justified. Furthermore, the reliability and validity of the study are discussed.

3.1. Research methodology

The topic of this thesis concentrates to identify how collaboration among large firms and startups enhances the green product innovation and thus, a qualitative approach is ideal as it allows a detailed analysis of the topic (Hirsjärvi, Remes & Sajavaara 2009: 164; Sachdeva 2008: 165). As the previous research of collaborative green packaging innovations between a startup and a large firm is very scarce as there are yet not that many companies implementing green product innovations in packaging it is rational to conduct a qualitative study. In a qualitative research the study is comprehensive acquisition of information and the data is collected in natural and real situations (Hirsjärvi et al. 2009: 164). The purpose of qualitative research is to be descriptive and conclusive and it is concerned with the individual's personal experiences of the problem under study. It is subjective interpretation of data collected by observing what people do and say. Meanings, concepts, definitions, characters, metaphors, symbols and descriptions are referred in a qualitative research and (Habib, Pathik & Maryam 2014: 9) thus, the object of the study is examined as comprehensive as possible (Hirsjärvi et al. 2009: 161).

In a quantitative research universally laws of cause and effects are highlighted (Hirsjärvi et al. 2009: 139) and the research includes collecting and converting data into numerical form in order research to make statistical calculations into an identified problem. The goal of this kind of research is to determine whether the predictive generalizations of a theory are true. Sample size is normally much larger than in qualitative studies and measurement is always objective, quantitative and statistically valid. (Habib et al. 2014: 8-9.) Based on aforesaid, a study of collaborative green product development would be difficult to execute as quantitative study. Thus, the approach in this study is definitely qualitative.

Moreover, there are three concepts that are clarifying the way for arguments and knowledge claims in science research: deduction, induction and abduction. Deduction is based on the idea that theory is the first source of knowledge whereas induction rests on the model that theories are outcomes of empirical research. Abduction, on the other hand, refers to the process of proceeding from descriptions and meanings given by people to categories and concepts which further develop an understanding to the phenomenon described. Abduction is a way of combining deduction and induction because neither of them seldom exists in research. (Eriksson & Kovalainen 2008: 22-23.) As long as this thesis aims to reassay the previous theory and increase the knowledge in the area of research through empirical findings, the logic of abduction is applied in this study.

3.2. Research strategy

Research strategy refers to the completeness of methodological decisions made in a research and there are three traditional research strategies: *experimental studies, surveys* and *case studies.* Experimental studies measure the influence of one variable to another and are thus mostly applied in quantitative studies which are conducted in controlled environments that allow the testing of hypotheses. Surveys aim to describe, compare and explain the phenomenon where the information is gathered from a group of people through questionnaires or structured interviews. Case studies, on the other hand, provide detailed information of a specific phenomenon by analyzing a single case or small group of cases linked to each other. (Hirsjärvi et al. 2009: 134–135.)

This study aims at finding motivations for collaboration between startups and large firms and examines how the collaboration enhances the development of green product innovations and thus, the case study is a perfect fit for this research. By analyzing small group of startups and large firms linked to each other will give specific information of the phenomenon. Because this research aims at elaborating and testing theoretical constructs by comparing a number of cases, the study can be seen as an *extensive case study* (Eriksson & Kovalainen 2008: 118). Extensive case study is especially applicable when there are gaps in the previous literature that need elaborating (Eriksson & Kovalainen 2008: 122) and because the prior knowledge of collaboration between startups and large firms specifically in the field of green product innovation is scarce, this thesis aims at elaborating the existing literature and is thus applying an extensive case study as a research strategy.

Moreover, according to Saunders, Lewis and Thornhill (2007: 135), the choice of research strategy is guided by the research questions and objectives made for the study, the amount of existing knowledge and the amount of time researcher has available. Moreover, Yin (1994: 1) notes that case studies are suitable when "how" or "why" research questions are posed and when the focus is on contemporary phenomenon in a real-life context. These arguments also support the choice of a case study as a research strategy in this thesis.

3.3. Data collection

The most common data collection methods in qualitative research are interviews, questionnaires, observations and analyses based on documentary information (Tuomi & Sarajärvi 2004: 73). The data can be divided into *primary data* and *secondary data*, where the previous refers to original and unedited information collected by the researcher her/himself and the later represents the information collected by someone else and is thus already managed and analyzed (Sachdeva 2008: 109). This thesis applies both data where the empirical data collected by researcher is called primary data and the news articles read for this thesis are called secondary data. Primary data is a reliable way to collect data because the researcher has collected it by her/himself and knows how data was collected and analyzed (Sachdeva 2008: 109) but the previous knowledge gathered from following the current trends in packaging from the social media and news helped the researcher to understand the phenomenon more deeply and analyze findings in the light of prior information. For example, medias such as Yle, HS and The Guardian were followed during the previous years, social channels such as #zerowaste and #bestofpackaging were followed in Instagram and packaging related companies were followed in social media and news as well.

However, individual in-depth interview is the primary data collection technique used in this thesis and it suits well in case studies (Sachdeva 2008: 167). Therefore, this thesis applies in-depth interviews with the company representatives as a primary source of data. The advantage of an interview is its flexibility; interviewer has the possibility to repeat the questions, correct misunderstandings, clarify concepts and make a dialogue with the interviewee (Tuomi & Sarajärvi 2004: 75). Due to these advantages, interview as data collection method suits well in this study because a deep understanding of the collaboration between startup and large firm is the intention in this study. Moreover, the

interviewee gets the possibility to be active member of the interview and is thus able to tell about her/his views as open as possible (Hirsjärvi & Hurme 2009: 35) and also focus on her/his subjective experiences and attitudes. Without personal interviews, these kinds of areas will remain inaccessible. (Denzin & Lincoln 2018: 669.)

Based on how structured the interview questions are, and how much the interview is led by the researcher, the interviews can vary between structured, semi-structured and unstructured interviews (Hirsjärvi & Hurme 2009: 44–47; Tuomi & Sarajärvi 2004: 79). In this research, semi-structured face-to-face interviews are conducted, which can be considered as intermediate form between structured and unstructured interviews (Sachdeva 2008: 168). Semi-structured interviews are based on pre-selected themes and questions related to them. The pre-selected questions used in this study can be found in the Appendix 1. In addition, the order of the questions may vary, and the wording of the questions may be modified. (Hirsjärvi & Hurme 2009: 47.) Interview as a data collection method is justified to acquire deeper understanding of the information (Hirsjärvi & Hurme 2009: 34) and thus, is perfect choice in this research. Semi-structured interviews also allow the flowing of the conversation to the direction that best gives the answers for the purpose of the study because semi-structured interviews rely on developing a dialogue between the interviewer and the interviewee. (Sachdeva 2008: 168.)

Due to emphasis on themes in the interview, semi-structured interviews can also be called as theme interviews (Hirsjärvi & Hurme 2009: 47). The aim of theme interview is to find meaningful answers to the research questions and choose the themes according to prior theory and the theoretical framework of the research (Tuomi & Sarajärvi 2004: 77-78). This research aims to examine how collaboration between startups and large firms enhance the development of green product innovations and the themes for the interviews are chosen according to structure of the literature review in this research. Moreover, individual face-to-face in-depth interviews (IDI) are conducted, except one interview was with two firm representatives. According to Sachdeva (2008: 169), participants are chosen because "their experiences and attitudes will reflect the full scope of the issue under study". Together six companies participated in this research: three large firms and three startups. The firms were chosen based on their external communication in news articles and researcher's prior knowledge about their green innovations and interest towards greener packaging. The market in this area is still very niche and thus, three of the interviewed large firms are making collaboration with one startup also concerned in this research. This gives a both side perspective into the study and credibility of the phenomenon.

Altogether, four startups and three larger firms were contacted via mail and phone during October and November 2018. First query of the interest towards interviews happened via mails, but no one answered and thus, calling to firm representatives was better option. Overall, six large firms and startups indicated awaken interest towards the topic and were delighted to be asked for interviews even though especially startup representatives were very busy. Actually, one startup could not participate in the research due to struggle with personal life and work pressure. In qualitative research, it is important to choose the participants according to their knowledge and experience towards the studied phenomenon (Tuomi & Sarajärvi 2004: 87-88). By following the conversation of new green innovations in packaging from the news during the year 2018, perfect respondents were easily found. In Finland, there are not many startups developing new methods of producing ecological packages and thus, the researcher had luck to interview them for this research.

The interviews were conducted in November 2018. All the interviews were face-to-face interviews conducted in the offices of the firm representatives, except one which was conducted in a library. Interviews were conducted in Finnish and they were recorded in order to make the analysis of the data more detailed and accurate. Duration of the interviews varied between 29 and 54 minutes. One startup representative was too busy to give longer interview and that is the reason why there are some duration differences in the interviews. The interviews were built around five themes, which guided the conversations. The guiding outline of the interviews were sent to firm representatives beforehand in order them to prepare for the interviews. The outline is included in this research as Appendix 1. The respondents represented those who were part of the collaboration processes and had lot of insights of developing green product innovations. All the large company representatives were working within the product development and had a background of chemistry and business. Startup representatives were CEO's and one was the Head of Marketing & Communication. Below, **Table 3** describes the interview details of this research more specifically.

Company (A, B, C = large firms D, E, F = startups)	Industry	Title / Department of interviewee	Duration
A	Food Services	Senior Manager, Packaging Development Senior Specialist, Packaging Developer	54 min
B	Cosmetics	VP Research & Development	35 min
C	Conglomerate	Head of Department, Product Development & Materials Management	40 min
D	Packaging	Founder & CEO	45 min
E	Packaging	Head of Marketing & Communications	29 min
F	Packaging and Design	CEO	42 min

Table 3. Interview details

3.4. Data analysis

After the collection of empirical data, the data analysis, interpretation and conclusions are in the core of the research (Hirsjärvi et al. 2009: 221). The purpose of the data analysis is to clarify the data gathered and thereby produce new knowledge of the topic. Therefore, the data is condensed in the more explicit form. (Eskola & Suoranta 2014: 138.) In this study, the data was collected by conducting qualitative theme interviews. It is acknowledged that the data gathered from the theme interviews is abundant and thus, it is recommendable to start processing and analyzing of the data as soon as possible after the data collection (Hirsjärvi & Hurme 2009: 135). Thus, in this study, the recorded interview data was transcribed into a written format right after each interview which made it easier to interpret what the representatives answered to each question.

First, transcriptions were conducted as word for word but later on, the transcribed data were cleaned up in order to make data more readable. According to Hirsjärvi and Hurme (2009: 135) it is not necessary to analyze all the material, and, in some cases, it is even impossible to exploit all the data. Thus, the data in this research was read many times in order to register the most important findings for the purpose of the study. Preliminary analysis was initiated as transcribing the data by listening, writing and reading the interviews multiple times. The most relevant comments from the interview data were outlined by the means of what is relevant regarding the research questions of the study. As the aim of the study is to find out how collaboration between startups and large firms

enhances the development if green packaging innovations, it is essential to concentrate on the data which gives deeper interpretations and perceptions of the topic under research.

According to Tuomi & Sarajärvi (2009: 95-99) there are three data-analysis approaches: data-driven analysis, theory-driven analysis and theory-bonded analysis. Data-driven analysis focuses on creating a theoretical framework of the data gathered, where previous observations, knowledge nor theories are not linked to the outcome of the study. The analysis is assumed to be data-centric. Theory-driven analysis on the other hand, has links to theory but those links are not based on theory directly but instead, the theory supports in the progress of the analysis. (Tuomi & Sarajärvi 2009: 95-96.) The third form of data-analysis approach is theory-bonded analysis which is also used in this research. Theory-bonded approach leans on a specific theory, model or a view of an authority where this model is presented, and the essential definitions are described in order to build a theoretical framework to support the analysis. (Tuomi & Sarajärvi 2009: 97.) Theoretical framework in this thesis combines the green product innovation theory to the collaboration capabilities between startups and large firms. In theory-bonded analysis, the data analysis is thus guided by the theoretical framework and previous knowledge is tested in a new context (Tuomi & Sarajärvi 2009: 97).

The data analysis in this study is conducted as a qualitative and theory-bonded analysis and as the amount of data gathered for this research is quite extensive, a content analysis is implemented as the data reduction technique in order to created codes and categories to analyze the phenomenon (Denzin & Lincoln 2018: 620). The aim of the content analysis is to get a condensed and general form of the phenomenon and seek meanings of textual data through interpretations and reasoning (Tuomi & Sarajärvi 2009: 103). The data analysis started by recognizing the issues phrases in the empirical data that are vital in the light of the research questions and objectives of the study. These expressions were then simplified through coding, which refers to splitting the data into smaller pieces (Eriksson & Kovalainen: 128-129).

After coding, original expressions were read carefully and similarities and differences were searched for and those were labelled into categories. After that, categories were named according to fitting description. Categorization was easily made by following the guiding outline of the theme interviews because the interview topics were selected based on the theoretical framework. Eskola & Suoranta (2014: 153) state that if the data is gathered through theme interviews, the guiding outline of the interview is a great instrument for coding and categorization. This also supports the reason why choosing the

theory-bonded analysis approach in this thesis. In theory-bonded content analysis, the categorization starts from building a subcategory from original expressions and later forming subcategories into main categories. Finally, all the main categories are combined into one connective category. (Tuomi & Sarajärvi 2009: 108-116.) The table 4 describes the progress of the theory-bonded content analysis conducted in this thesis.

Original expression	Simplified expression	Subcategory	Main Category	Connective category
" […] it has the own charm: there are young professionals who we can help in their commercializing process, which is not an easy thing."	Collaboration with startups is satisfying	Commercialization process	Large firms' motivation to collaborate	**Collaboration enhances the development of green product innovations**
"These kinds of innovations are incredible because you can think about how they can be scaled up and this is the point where large firm steps in with their experience."	Large firms are needed in when scaling the innovation	Green innovations suits to any industry	Startups' motivation to collaborate	

Table 4. The progress of the content analysis (revised from Tuomi & Sarajärvi 2009)

This thesis uses multiple original expressions from the interviews in the chapter 4 of findings and discussion. As seen from the Table 4, quotations of the firm representatives

were easily fitted into each sub-chapters and later main categories in the analysis phase which facilitated the data analysis of this study.

3.5. Reliability and validity of the study

Avoiding mistakes is an objective of every study and hence, in a single research, the reliability and validity of the study should be concerned (Eskola & Suoranta 2014; 211; Tuomi & Sarajärvi 2009: 134). The reliability of the study refers to the repeatability of the research findings and thus, the fact that two researchers would get the same results if conducting a research. Study is reliable if the results are non-haphazard. (Hirsjärvi et al. 2009: 231.) The validity of the research, on the other hand, refers the ability to measure exact the same as was intended to measure (Eskola & Suoranta 2014: 213; Hirsjärvi et al. 2009: 231; Tuomi & Sarajärvi 2009: 136).

In interviews, there is a risk that respondents may understand the aim of the study and the questions differently than the researcher which creates errors in the results and thus, the findings cannot be considered valid (Tuomi & Hirsjärvi 136-141). Considering this research, the participants were informed about the detailed purpose of the study and the value of the interviews considering the topic of novel green innovations in packaging industry via phone at the same time that they were asked to participate in the study. In addition, preliminary interview questions were sent to the participants before the interviews. In this way, they had the chance to prepare for the theme interview, and also in order to increase the validity of the data. This also minimized the confusion about the purpose of the study.

The quality of the study should be observed during the different stages of the research. The quality of the interview data can be maximized already before the interviews by forming a clear guiding outline for the interviews. (Hirsjärvi & Hurme 2009: 184.) Considering this research, this can be found from the Appendix 1. Moreover, optional additional questions were formed before the interviews, which also is beneficial in the light of the quality of the research. Recording the interviews also ensured the factual accuracy of the data, because the interviews could be listened many times during the analysis phase. Furthermore, the next chapter of findings and discussion uses multiple quotations from the interviews which increases the possibility for the reader to understand where the discussion and conclusions of the researcher comes from. The direct quotations used in this study were sent to firm representatives before publishing the study in order

them to check their sayings. Some of the representatives suggested alternative wordings to some comments and little editing was made to direct quotations in order them to better fit the meaning of the representatives. This was done so that misunderstandings were minimized. These actions also increased the validity of the findings.

4. FINDINGS AND DISCUSSION

The profound purpose of this study is to research how the collaboration between startups and large firms enhances the development of green packaging innovations. This chapter focuses on examining the findings of the study based on the interviews made. Multiple quotations from the interviews are also used in order to support the analysis. Findings are further combined and discussed with the findings from the previous research related to green product innovation and collaboration activities among startups and large firms, taking care of the transition towards more ecological packaging.

4.1. Introduction of the case companies

As the aim of the study is to examine the collaboration between startups and large firms in green product innovations in packaging, the case companies were selected appropriately their size and interest in green packaging solutions. Three startups and three large firms that are focusing on green packaging solutions participated in this research. To secure the anonymity of the firms, company names are not mentioned in the analysis but are referred as company A, B, C and startup D, E and F.

Two of the startups are founded in 2015 and one in 2016 (Startup E). Firms D and E only concentrate on ecological packaging solutions as their main business and the third startup F offers sustainable lightning solutions, coat hangers and for the relevance of this study also packaging solutions. The case startups in this research are founded only couple of years ago which signals the growing interest towards green innovations in packaging. One startup was founded on the mission to save the world from plastic waste, one due to fight against plastic bags that are polluting the oceans and the one startup was originally founded because of the founders' crush on cellulose as an ecological material. Thus, all of the startups in this study care about environment and are creating green innovations that suit well on the definition of green innovation from European Commission (2012: 1) mentioned in the beginning of the chapter 2.1. In addition, all of the three startups in this research represents a very niche market in green packaging industry, and there are not that many of them in Finland.

All of the startups have made or have on-going projects with large firms concerning green innovations in product packaging. Large firms A, B and C are making collaboration with the startup E. Startups D and F don't have matching companies in this research but those

can be considered as a great sample of companies representing the revolutionary eco-packaging solutions for large firms. All large firms in this research are big players in consumer products and all are from different industries: cosmetics, food and conglomerate. The dissimilarity of the large firms in this research gives good perspective of the importance and relevance of this study because companies have a growing interest towards green packaging solutions in their products, no matter the industry. Large companies in this study have experience in collaborating with startups also outside the green innovations. Even though this study concentrates specifically on green product innovations in packaging, the large firms' previous experiences with startups can be seen as an advantage for this specific topic as well.

Large firms' representatives interviewed for this study are all working in product or packaging development and they also take care of the regulatory requirements of the products and/or packages. Hence, they have given remarkable effort for this study and especially in the context of developing green innovations in packaging. Startup representatives, on the other hand, two out of three are CEOs and one is responsible for Marketing and Communications but also responsible for Vice President role in the startup and thus, also he shares valuable insights into the topic of this research. Next chapters are built according to answers given in the interviews, they are combined together with other interviews and also reflected to the previous literature researched for this study.

4.2. Interest towards green innovations in packaging

Based on the interviews, all the firms see that the interest towards green packaging is growing in the future and this is very well in line with Doyle (2012) who states that Finland has eco-conscious behavior and consumers are becoming more aware of the environment-friendly packaging and products. Company representatives claim that the amount of the ecological packaging is also going to increase in the near future due to consumer awareness, newly developed green innovations and plastic waste boom. Overall, during the interviews it is found out that all the company representatives are very interested in novel green packaging innovations and sustainability of their products in general. They show great interest towards the subject and share their views frankly and enthusiastically which is supported by prior literature as it claims that companies are keen on ecological responsibility which drives GPI development further (Dangelico 2016).

In the beginning of the interviews both the startups as well as large firms' representatives were asked about their connections to green innovations. The data collected during the startups' interviews reveal that green innovations are in the core of startups' businesses and their personal ambitions of making the planet cleaner has enhanced the opportunity to create novel green product innovations.

> *"I am very closely attached to green product innovations through my company." (Startup F)*

> *"Our business plan was formed five years ago when we noticed that there are lot of talk in the media about plastic problem and especially large corporations began to be active and searched for alternatives for the plastic." (Startup D)*

During the interviews with large firms it appears that large firms are also shaping their processes in order to create more environment-friendly solutions for their customers. As highlighted by Hao et al. (2019) the hype about green packaging is definitely increasing among companies in all kind of industries. In addition, representatives agreed that large firms are pushed to think more ecologically of their packaging solutions, and it puts pressure on the side of the product development. As highlighted by Mason (2013), consumers are becoming more aware of the sustainable options in product packaging and demanding greener packaging from the big brands. This is also agreed by both the large and small firms.

During the interviews most of the respondents highlighted the impact of the media and social media considering green packaging. Papers and social media are reporting and publishing continuously new facts and news of ending natural resources and pictures of oceans full of plastics. The hype of sustainability is forcing big brands to think more about their decisions while new startups are established to solve these problems. All the startups interviewed for this research are also established recently. Moreover, it is acknowledged in the interviews that the transition towards more sustainable thinking has grown very fast and it also reflects not only the product itself but the packaging around it.

> *"[...] when brands contact us, most of them say that they want to position themselves a bit differently and are taking this [green packaging] very seriously and are even ready for development work together." (Startup E)*

> *"When thinking about being ecological and natural, we started more from the content of a product. However, it is not enough, it's just half of the product and we wanted to think more holistically and that's why the packaging of the product needs to be in line with the content." (Company B)*

According to these arguments, both the startups as well as large firms have noticed the urgent need for developing greener packaging for their products.

In addition, the pressure of social media is highlighted by the representatives. There seems to be a clear difference between large firms' and startups' attitudes towards the hype of greenness in the social media. Startups boost the hype and see it positive whereas large firms react to consumer trance more incredulous. Below, company A highlights the pressure of social media related to green thinking.

> *"The problem is that especially small firms and consumers are boosting green thinking in the social media even though they don't always know what reality is. The fuss is bigger than the knowledge and that causes pain for us." (Company A)*

Here the company A sees that a large brand especially has the sustainable responsibility because they should do the long-lasting choices and take the responsibility also in a national level and not to follow consumer demands too conscientiously. In addition to this Company B reminds that social media can also be a channel to understand consumer needs better. According to her responses, social media enables an easy way for consumers to give feedback and ask questions regarding company's products. Company B believes that through consumer wishes on social media they can better develop their products and packages to the direction that better answers consumer needs. These aspects of the media are in line with the previous literature which argues that desired brand image and reputation can be achieved through developing green innovations (Cai & Li 2018; Pacheco et al. 2018; Melander 2017; Rumanti et al. 2017; Dangelico 2016).

Interest towards green product packaging also emerges on attempts to create strategies for more sustainable business in large companies (Díaz-García et al. 2015; Lin & Chang 2009). For example, company A's representatives have been part of creating their Group's Sustainable Packaging Strategy where it has been considered what sustainability means in their packaging development and how it could be enhanced. Large firms' strategies are more and more focused on environmental aspects in their business decisions and thus, green innovations are in their interests. The representative of company C reminds that ecological packaging has always been under their interests and they have always endeavored to make choices that are durable for the environment. Hereby, it can be concluded that even though ecological choices of the large firms might have been under the focus also previously, now the subject is on the surface and like García-Granero et al. (2018) state, the climate change is forcing us to find a balance between consumption requirements and sustainability.

4.2.1. Plastic waste boom

The plastic waste problem appears in every interview made in this study and it is taken seriously both on the sides of the startups as well as the large firms. Startups interviewed for this study have noticed that big brands are searching more for new alternative choices for plastics in their packaging than they were before. Startup F states the following:

> *"Large firms will think more of the packaging of their products. After all plastic is oil-based material and we will run out of oil at some point. This kind of problem emerges easier in large business when volumes are big and use of materials is also larger." (Startup F)*

All the three startups see the potential of substitutive materials for plastics and according to startup representatives in the near future more actors will enter the markets with novel technologies and materials that are answering the problems of unsustainable packaging materials, such as plastics. Large firms agree that there are more options available for the plastics as a packaging material than there were couple of years ago, but application of new innovations is a complex process to be implemented into their existing products. However, it is seen that the discussion of plastic waste problem affects to every industry using plastics and companies are forced to think how they solve new business challenges in changing environment. Also, the previous literature agrees on the fact that plastic waste boom is affecting regardless the industry (Dahlbo et al. 2018; Mitchell et al. 2018). However, one large firm says that they don't even want to find a plastic-free world because the plastic is seen as a superior material that none of the existing innovation can replace it without raising the product price for the customer.

> *"Plastic is a superior material and we are not looking for plastic-free world." (Company A)*

In this case, the plastic packaging is seen to protect the product better than other materials. Still, the company A is making collaboration with a startup and developing innovative green packaging for their chosen product and they say they are ready to replace plastic if equally good and durable material is invented one day. Startup F reminds that especially disposable plastic products are the problem, not the plastic itself. However, despite the superiority of the plastic, replaced materials and innovations for packaging are welcomed by every company representative interviewed for this study.

> *"We have always been interested in different kinds of packaging alternatives and if the new innovation fulfills the role of the package, we consider it as a good alternative." (Company A)*

As the plastic waste is one of the macrotrends of the era, companies are taking their packaging decisions more into account and trying to offer consumers ecological choices

that meet the criteria in every aspect of the product. Important factor in ecological packaging the large companies highlight is the fact that the packaging needs to be durable and cannot damage the product in anyway. As highlighted also in the previous literature (Hao et al. 2019; Dangelico & Pujari 2010), even though green innovations demonstrate impressive environmental performance the most important factor is to maintain functional benefits of the product.

> *"[...] packaging is according to regulations, they are safe for the consumer as well as disposable and desirable, which is maybe the most important factor because if we develop products that no one wants to buy, it is far from environmental protection, rather it is called waste of resources."(Company C)*

> *"[...] it is vital that the packaging protects the product in the best possible manner." (Company A)*

Large firms underline the product safety considerably and tell that they aim to make decisions that are durable and long-lasting. The most important factor is that the product lasts in the packaging, it is easy to transport and that it is easy to use for the consumer. Also, Grönman et al. (2013) agree that the main task of the package is to protect the product itself. Even though there is a growing interest on green packaging and new innovations related to it, it is seen difficult to find a substitute for plastic as a packaging material because of the composition of the product itself. One large firm reminds that some packages are made from thick plastic only because the production machines are not capable of doing the plastic any thinner. The product itself would survive well also with a thinner plastic package. Here the problem lays on technological limitations. Startups, on the other hand, of course see the importance of the durability of the packaging but they do not highlight it as much as large firms because they don't have the industry knowledge or knowhow of specific requirements set for the product safety.

4.2.2. Replacing, reducing and recycling

Like Dangelico and Pujari (2010) claim, the material reduction in packaging is shaping the sustainable packaging trends currently. The aspect of replacing and reducing also arises from the interviews. However, there are some differences of opinions among large firms and startups whether replacing or reducing in packaging is topical. Startup D states that the interest in packaging is more in replacing than reducing the material and Startup F unites and emphasize on finding alternative solutions for the single-used plastic.

> *"[...] especially green replacing – replacing oil-based options by renewable, biodegradable or non-micro plastic material seems to be on the increase. Rate of change is only increasing all the time." (Startup D)*

> *"Consumer awareness has lead companies to a situation where they need to think about replacing the material." (Startup D)*

> *"I actually try not to make juxtaposition among plastic and other materials. I prefer thinking about different alternatives and how we could replace plastic." (Startup F)*

These arguments are logical based on the fact that the case startups in this study have invented a green innovation that is an alternative for traditional materials in packaging. The concerns of inconsiderate use of plastics have led startups to develop alternative choices for packaging. All the startups highlight the possibility of replacing old methods used in packaging to greener solutions available on the market. However, large firms' representatives have both replacement as well as reducing targets for their existing product packaging. One large firm representative interviewed for this study share the opinion of replacing traditional materials used for the packaging with more ecological options available on the markets whereas Company C tells that 90% of their product packaging can be recycled.

> *"[…] our thinking starts from the fact, that either you can fully replace something worse or you can reduce the use of some less ecological material." (Company B)*

> *"We think all the time how to increase ecological packaging in our products […] at the moment, 10% of our products are not directly recyclable plastic whereas 90% is recyclable." (Company C)*

All in all, startups are more on the side of replacing whereas large firms see it also positive to reducing the packaging material around the product or using recyclable material. Still, recycling is highlighted in every interview and emphasis is put into creating a better circular economy and a system where consumers can recycle the packages easier. Recycling is also widely discussed in the previous literature (Dahlbo et al. 2018; Melander 2018a) and according to interviews, a working recycling system would allow the reusability of the plastic which is seen possible to create in such a small country as Finland.

> *"[…] for a small country, it is way easier to execute new systems [talking about creating a fully functioning recycling system]." (Startup F)*

During the interviews also the future of packaging is discussed. Most of the interviewees support on creating more advanced recycling system where everything is easy to recycle and reuse. According to one startup representative, the ideal would be that a consumer can just grab a product from the supermarket's shelf without thinking whether it is an ecological choice or not. Thus, the responsibility of producing an environment-friendly packaging should be on the side of the big brand.

4.2.3. Consumer awareness ahead of regulations

Cai & Li (2018) have recognized the customer demand as a strong motivating factor for companies to create novel green product innovations. This argument finds support during every interview made for this study. Big firms and startups agree on the fact that big brands are forced to think more ecologically on how they pack their products because consumers are becoming more and more aware of the environmental problems. One startup reminds that 1,5 years ago people didn't even know what micro plastics is but now everybody knows. According to interview data, consumers are becoming more and more aware of the sustainability issues and it also has an impact on demanding greener packages for the products.

People are increasingly making their purchase decisions according to greenness but however are not ready yet to pay more from eco-friendly products. This is agreed by the firm representatives and also by the previous literature (Mitchell et al. 2018; Mason 2013). Furthermore, if the packaging seems green it attracts the interest but if the price is significantly higher, the product stays in the shelf. Below are examples gathered from the interview data.

> *"There are lot of people with green mindset but before the greenness is seen in their purchasing decisions, it takes time. Instead of buying a green product, people will still pick the half cheaper product." (Startup F)*

> *"[...] we have experiences that if the price increases enormously, volumes will decrease as well." (Company C)*

> *"[...] consumers have not been ready to pay for different kind of packaging material - the price has traditionally been the trendsetter." (Company A)*

In addition to consumer demand towards greener products and their packaging, regulatory changes are also affecting on company's decisions of what material to use in their product packaging (Dangelico 2016; Dangelico & Pujari 2010). Regulations shape the packaging requirements and often regulatory aspects are tied into product development departments in large firms, as well as in case companies in this study. When asking them about new regulatory changes and plans on product packaging large firms and startups see that consumer demand is always couple of steps ahead and legislations and regulations drag behind. Company B's Vice President of R&D states that often the voice of a customer shapes more demands towards product packaging development than the legislation.

> *"The voice of a customer is much more significant than it was before. Formerly, legislators were defining the direction but nowadays it is definitely the consumer who defines where to go next." (Company B)*

This contradicts with the previous literature which argues that motivation is mostly oriented by compliance and standards (Melander 2017; Bossle et al. 2016; Dangelico 2016). All the company representatives in this study strongly see customer demand more motivating factor to develop greener packages than legislation. If taking account that the scientific literature regarding green product innovations is still young, and most of the publications are from this century, the contradiction can be seen understandable. And even though consumers push packaging development towards certain direction, large firms remind that they also need to think forward what kind of legislation could be someday and where the world is going to. Some of the interviewees are part of different kinds of organizations and groups that are aiming to reflect the future and where information is shared among other firms and organizations.

Altogether, both large firms and startups share the opinion that consumers are defining the direction that big brands will follow. The consumer demand is taken seriously and moreover, all the case companies see that they have better capabilities to answer consumer demands in green markets when they are collaborating with a startup or a larger firm. Thus, next chapter focuses on this argument.

4.3. Motivation for collaboration in green product innovations

Weiblen and Chesbrough (2015) claims that large corporations might be hard to approach for small firms but according the data gathered, harder seems to be pitching the innovation or the business idea to the large firm in a way that they take the startup seriously. One startup says that she has heard from other entrepreneurs that bigger firms sometimes patronize smaller firms and are not taking them seriously. On the other hand, other startup representative in this study says that they have taken part in different kinds of competitions which have brought awareness among big brands. In this study both the startups and large firms have taken the first contact towards collaboration.

> *"We saw an article of an interesting startup and though that it would be great for us. And we contacted them." (Company C)*
>
> *"I admit that in the beginning we were knocking on the large firms' doors, presenting our idea and finally some of them let us in." Startup D)*

Moreover, the scene in packaging seems to be small and people are well networked. It emerges that there were connections among the case firms already before the collaboration started. Within the startups, entrepreneurs had previously made a career in a large firm which is now a collaborating partner of the newly established startup.

Contacts from previous life have helped startups but also larger firms to find suitable collaborating partners for green product innovations.

> *"Primarily, we had very good network […]" (Startup F)*

The value of networking is in line with the previous literature of Dangelico (2016) where it is acknowledged that creating and fostering networks of collaboration are important for green product innovation development. Furthermore, Melander (2018b) highlights that finding a suitable partner for innovation is vital. Three out of six case companies in this study had connections to the future collaboration partners which is in line with the importance of networks. In addition, as Weiblen & Chesbrough 2015 have discovered there seems to be an increased amount of corporate efforts towards startup ecosystem. Some of the large firms tell during the interviews that they have specific strategies within the organization in order to enhance the collaboration with startups. This will be discussed more in the chapter 4.3.1. of large firm's motivation to collaborate with a startup.

According to interviews, greenness in packaging seems to cause challenges for large firms because they are mainly using plastic as a packaging material. Large firms are seeking for alternative solutions to the problem or at least are open to new innovations. Also, previous literature claims that companies are more and more interested in finding new solutions related to green innovation capability and typically collaboration with external partner begins because company's own functions and skills are not enough when developing radical and novel green product innovations (Dangelico et al. 2017; Halme & Korpela 2014). In addition, as long as plastic and plastic waste are one of the macro trends of the day, consumers are demanding new ecological options for packaging from large firms. This is also acknowledged by startups:

> *"I saw here a big trend – large amount of global companies looking for green solutions." (Startup D)*

Also, Company A sees the potential of collaborating with startups within green product innovations:

> *"In my opinion, the significance of startups lies in awakening large firms to see new trends." (Company A)*

Startups interviewed for this study see a huge potential of their offering in the era of more ecological packaging because they are aware of the fact that large firms might not be packaging producers by themselves. Also, large companies interviewed for this study remind that packaging of the products is not in their core business even though the packaging of a product is receiving much more attention than before.

> *"[...] because we are not a packaging material producer, packaging development is in co-operation with the material suppliers." (Company A)*

Huang & Li (2017) argue that firms that are environmental aware tend to collaborate on innovations with external partners more than just innovative firms because they understand the importance of collaborative R&D in developing novel green product innovations. All the firms interviewed for this study are environmental conscious and eager to develop new innovations in packaging in order to both fill the customer demand as well as protecting the nature. Companies in this study value the effective collaboration where people from different backgrounds and functional areas enhance the innovation success. In most cases, startups' new innovations are seen as an opportunity to be implemented into companies' product packaging which is often a start for collaboration. Large firms show great interest towards startups' novel innovations and are eager to having an opportunity to collaborate with them and develop innovations together.

4.3.1. Large firm's motivation to collaborate

According to large firms, startups are seen as charming and enthusiastic collaborating partners who have the energy to bring new solutions and innovations into existence. This is in line with the previous literature which argues that companies are eager to collaborate with startups in order to become more entrepreneurial (Hogenhuis et al. 2016; Weiblen & Chesbrough 2015). Startups' enthusiasm is seen as an attracting factor when asking large firm representatives' motivations to collaborate with them. The eagerness and the drive to work are seen admirable and something that large firms can even get a hint to their own style of working. The diligence of startups' working style is also seen admirable by large firms.

> *"In general they [startups' employees] are enormously excited and motivated to one thing, they can concentrate only on that. In a large firm, it is very rare to have an opportunity to only have high focus on one thing." (Company A)*

> *"I believe they [startups' employees] are working 24/7." (Company C)*

Large firms are impressed by the enthusiasm of how startups do things because according to Company A representative, in large firms resources are divided into many categories and there is a lack of certain kind of innovation centers. Thus, the enthusiasm and fire to create new is looked for among startups. On the side of the startups, they were also asked why large firms tend to have interest towards collaborating with them. Startups consider that they are seen capable of arousing enthusiasm and excitement which is one reason why they are approached by large firms. Moreover, startups see their collaboration

partners as forerunners who are eager to think outside the box and try new things in order to satisfy the customer needs.

> *"The major part of the large companies that have contacted us, are forerunners. They see that they need to jump into this sledge." (Startup E)*

Hora et al. (2018) state that startups will have more time for own activities when collaboration with large companies but for large firms the innovativeness is the great benefit from collaboration with young and enthusiastic entrepreneurs. Moreover, like Mason (2014) states, packaging is an extension of a company's brand and if a product has an environment-friendly packaging it is said that the company is trendy, innovative and responsible (Mason 2014). This is also agreed on the side of the large firms and they are eager to develop new solutions together with startups.

> *"Mostly, I see the value in innovativeness and the possible solutions we can together make possible." (Company B)*

However, despite startups' enthusiasm, the clearest reason for a large firm to start collaborating with a startup is not the fact that the partner is innovative startup, rather the business idea they have, just like Startup E claimed about the forerunner position of large firms.

> *"The reason for collaborating was the fact that the business idea of a startup was a perfect fit for us." (Company C)*

According to large firms, collaborating with startups fascinates them because they have novel ideas of packaging and those would suit to many products and industries. It is seen by large firms that startups have more competencies and skills related to green packaging innovations because they have gone further in research in this specific subject. They have the capabilities to be top in the specific innovation technology because their business is concentrated on this very specific area rather than a complex organizational structure like in large firms. Bos-Brouwers (2010) has also investigated the innovation capabilities of startups and according to her, startups' organizational structure allows employees to innovate and experiment novel ideas.

In addition to startup's enthusiasm and innovation capability, other motivational factors for collaboration are also recognized among large firms. Company C sees it rewarding to help startups in commercializing process because it is in the expertise of a large firm and startups need help in order to launch their innovations.

> *" […] it has the own charm: there are young professionals who we can help in their commercializing process which is not an easy thing." (Company C)*

Company B adds that the fact that the startup they collaborate with is Finnish is a remarkable factor which is a huge motivator to collaborate. For a background information Company B is known for products inspired by the beauty of the Finnish landscape and thus, for them it is vital to know which companies they collaborate with.

> *"[...] especially Finnish innovations have the special status for us [Company B] and we want to collaborate with Finnish firms in related to these things [green packaging] if there are that kind of firms in the market, and there are nowadays." (Company B)*

Company A, on the other hand, has in their group strategy that they aim to support startups and collaborate with the suitable ones. The problem is only to find a right angle to approach business with an interesting startup with an idea. Company A representatives admit that they are approached by many different kinds of startups which bring lot of knowledge of the newest innovations. They are very open-minded for the new solutions of startups and claim they following:

> *"If we find an idea which can be implemented for our product, of course we are taking the chance. With a startup E we found a perfect angle to bring the product and the packaging innovation to the market." (Company A)*

Company A admits that they have had other startups with whom they have tested and investigated green solutions for packaging, but nothing has come into the market. However, it is revealed that Company A has also made collaboration with a Startup D even though this was not the main reason to interview them in this research. All in all, all the large firms interviewed for this study have previous experience of working with startups even though collaboration within green packaging is new for everyone. Hence, large firms seem to have eagerness and enthusiasm to try and explore new areas in order to develop greener packaging for their products. Large firm representatives seem to own some kind of entrepreneurial mindset which has led to collaboration with startups' employees. Despite the eagerness to collaborate with startups, collaborating also terrifies occasionally large firms because the team behind a startup is small and they are new operators in the field.

> *"When we develop something for the first time for food supplies, no one can estimate what kind of problems may emerge. Risks are higher with startups than large traditional actors. But on the other hand, the results might be totally new." (Company A)*

Still, according to interviews with large firms, the overall attitude towards collaborating with startups is positive and all the three firms see the possibilities of developing green product innovations in packaging bigger when collaborating instead of developing greener solutions by themselves.

4.3.2. Startup's motivation to collaborate

Startups see a huge potential of scaling that large firms can provide for them and their green innovation. Thus, extended sale capacity and broad distribution channels attract startups to find suitable firms to collaborate with them (Hora et al. 2018). In addition, startup representatives in this study highlight the experience of large firms. They might have been part of producing packaging for decades and they can share their experiences of what works well and how the novel innovations could be scaled. Startup D's representative talks a lot about scaling its business and according to him, it is only possible through a collaboration or partnering with a large firm. From collaboration relationship they admit that they need financial support.

> *"For a small business it is always a challenge how to finance the growth" (Startup D)*

Startup E sees the large firms they are collaborating as forerunners. And according to startup E's representatives, large firms also have the ability to test new things and collaborate with startups. As discovered by Hora et al. (2018) and Hogenhuis et al. (2016), startups' novel innovations need larger production resources which are typically founded through collaborating with a large firm who already has the resource base and advantages technologies to produce and scale green product innovations of a startup. All the startups' innovations in this study are possible to produce in the existing factories large firms have. This makes it easier to start collaboration because huge up-front arrangements are not needed. This means that large firms don't need to build new production lines or factories in order to produce green packages for their products.

> *"These kinds of innovations are incredible because you can think about how they can be scaled up and this is the point where large firm steps in with their experience." (Startup F)*

Startup F agrees with Startup E on seeing large firms as an idea enabler. It is not possible for a startup to invest on own production line because they don't have the resources to test and scale their innovation.

> *"I doesn't matter how much we have ideas if we cannot produce concrete products." (Startup F)*

Large firm A also agrees on the fact that startups need larger firms in producing their innovation:

> *"[...] in order to really create a product you need lot of technical know-how and the resources to create the product packaging in technical scale." (Company A)*

Thus, in order startup's innovation will become something big, large firm is needed in the development process as well as commercialization of the product. Both startups and large firms agree on this according to the interviews. Startup is often built around the core idea which is not necessarily the final product the consumer sees. Startup does not have the capability to produce their innovation industrially much less to bring the innovation into the marketplace. The company A states this well below and Startup F agrees.

> *"In my opinion, we need startups for idea generating but in order the ideas come into existence in the long run, we need large firms with their experience." (Company A)*

> *"After we have created connections to existing large firm who has the know-how and manufacturing capability. It has had an enormous value for us." (Startup F)*

Startups in this study highlight the importance of having relationships with larger firms in order to get the access to the knowledge and production lines of a large operator. Without collaborating in green product innovations some ideas will never see the sun. These arguments of startups' representatives are in line with the existing literature which shows that it is possible to create green innovations from scarce resources if the company collaborates (Halme & Korpela 2014).

Moreover, according to interviews, also the big brand name attracts startups to start collaboration with large companies. Startups see that they have better possibilities to bring their green innovation into the existence through collaborating with a firm who already has name and consumers are recognizing their products in Finland. Already Usman and Vanhaverbeke (2017) have mentioned the reputational benefits of the collaboration with a big actor in the market; the positive reputation can be an advantage for future endeavors and in this study, startups consider that large firms can also bring them advantage on awareness among the consumers. In addition, startup E has made conscious decisions and attended to various competitions with their green product innovation and through their participations in several competitions they have been contacted by large firms.

> *"[...] and then brands approached us and told us 'hey you have this cool innovation, could we do something together?" (Startup E)*

Thus, the intention was to wake up large firms' interest and find collaboration partners among large firms already in the beginning of the startup's business. All in all, as Halme and Korpela (2014) have argued, it is possible to create green innovations from scarce resources if the company collaborates. Startups in this study are well aware of the fact that finding a large collaboration partner is essential in order to succeed with their green product innovation. As long as great collaboration partners are found among large firms

and startups, the collaboration capabilities needed for creating green packaging innovations should be discussed and analyzed. The next chapter focuses on that.

4.4. Collaboration capabilities needed for creating green packaging innovations

One profound reason for collaboration between startups and large firms emerges from the interviews; the agility of a startup combined with the experience and resources of a large firm forms a value that can be achieved through a great collaboration relationship. Already Bos-Brouwers (2010) has investigated the capabilities of startups and large firms and by combining the capabilities better innovation capability can be reached.

> *"For a startup experimenting is easier. All kind of decision-making is simpler in a small company. […] Startup is normally a few persons company where a five-minute call or f2f meeting can change the whole brand or something similar. Decision-making is extremely easy; experimenting is extremely easy." (Startup F)*

> *"Large firm can experiment many things at the same time but their ability to bring product to the market is slower." (Startup E)*

During the interviews the style of working both in startups and large firms are discussed. The characteristics of organizational structures that enhance the innovation capability are understood as well as emphasized in the interviews. Large firms are looking for innovation capability whereas startups resources. However, companies in this study highlight that important is to understand how these two are combined in order the collaboration enhances the development of green product innovations.

> *"If very small startup and large firm is put side by side, the challenge for collaboration is how these will match with each other's. Can we find a situation where both have the same interests?" (Startup F)*

As above comment states, the collaboration must begin with a partner who shares the same interests. Startup E agrees on this and highlights that startup needs carefully choose what it is doing whereas large firms can have several processes at the same time due to their large resource base. The previous literature (Hora et al. 2018) also emphasize that both parties should benefit from the collaboration in order the common projects to succeed. This is in line with the results gained from the interviews; term "win-win situation" appears in several interviews and thus it is seen important that both parties benefit from the collaboration.

> *"It is not about how large firms benefit from startups but rather on both sides, it's more about win-win situation." (Startup E)*

> *"[…] that both understands that we want to do this together and how we develop further together and how we can make it even more valuable together that it would have been made separately." (Startup E).*

In addition to win-win situation, collaboration in asymmetric relationship between a startup and a large firm requires mutual trust (Wang & Hu 2018). Building a relationship which is based on trust and openness is vital according to interviews. Moreover, in order to create novel green packaging innovations, it is required that startup's innovation is customized to large firm's product. Novel innovations of startups are implemented on the existing products of large firms and thus, close collaboration is needed.

> *"They really need to be capable. They got to have attitude and they must bring something new to us. Excitement." (Company C)*

Company A makes an exception and is developing a completely new product with the startup's packaging innovation around it. They first tested packaging innovation on an existing product but according to representatives, food industry requires lot of testing before the product can be sold in the market and the product was not ready before Christmas when it was supposed to be in the shelves.

4.4.1. Common interests

Interest in sustainable packaging solutions seems to be in the core to collaborate with a startup or large firm that shares the same values. It is vital that collaboration partners share the same vision of the common project (Hora et al. 2018; Usman & Vanhaverbeke 2017). Both the startups and large firms agree on this and mention the common goals and interest before even asking.

> *"[…] collaboration must have clear common goals […] in order to benefit both." (Company B)*

> *"It was clear to us that this is an ecological and good solution for us, and they also shared the interest. This was a good match." (Company C)*

Common goal is to develop a greener packaging for the product of a large firm. Startups believe in their novel green innovation and large firms are clearly interested in the idea and see the potential of developing the innovation more suitable on their products. Company A tells that they have defined an exact goal of the product and what are the advantages of the greener packaging. Company B and Startup E agrees on this:

> *"[…] of course we have defined specific goals on what kind of products we are aiming at and how we can utilize startup's innovation." (Company B)*

> *"Bigger collaborations, of course we negotiate what we are doing, and we define the targets together." (Startup E)*

> *"[...] common goal is that the consumer likes the product, wants to buy it again and that both of our reputations grow [...]" (Company C)*

Thus, companies in this study seem to have same vision of the collaboration. Among the case companies it is seen vital that common goals are defined and everybody in the process knows what the next steps are. This is in line with the previous literature (Melander 2018a; Hora et al. 2018; Usman & Vanhaverberke 2017) which states that by sharing objectives for green innovations minimizes the risks of misunderstandings between the parties involved. According to Company B, without clarifying the common goals the project will remain fuzzy and no one will benefit from the collaboration. The representative of Company B states:

> *"Collaboration should be built on clear and shared objectives, which we are reaching together in a way that benefits both." (Company B)*

According to these arguments, common goals of the collaboration cannot only be ideological and value-based but also measurable and clear. However, it is not always easy to find a perfect match who shares the common goals and this is also acknowledged by the firms interviewed for this study.

> *"[...] you need to do enormously work in order to find a partner with chemistry. Chemistry should work in personal level, find a common enthusiasm and interest in the topic." (Startup F)*

During the interviews companies were asked whether they discuss about targets and goals before the project starts because according to previous literature (Hora et al. 2018), defining objects and milestones of the project beforehand is proved to enhance the collaboration results. Large firms especially see it important that the common goals are shared in order to collaboration succeed. Timelines and steps are specified among some companies more specifically than in others. Large firms A and B see it important to define precisely the products the collaboration is aiming to create because according to them this allows better use of the startup's innovations. Company B adds that startups usually need to report continuously to their investors about how things are going and thus, it is vital to have clear goals in a concrete form. Financing of a startups often rely on great results and how development processes are succeeding. Company B reminds that targets and objectives are usually defined in the agreements as well. In most cases a letter of intent is made, and it specifies the targets and timetable of the project with a collaborating partner. Startup F also emphasizes conversation in the beginning of the project regarding the targets:

> *"The collaboration must start from discussing about the subject and enthusiasm for collaboration must be found." (Startup F)*

Nevertheless, some of the firm representatives admit that common goals are not always shared because they are not discussed enough. Startup D, for example, admits that there should be more conversation of the common goals and steps should be defined more specific. Like Melander (2018a) states, contractual arrangements in early phases of collaboration would clarify the steps of the collaboration). On the other hand, according to Startup F, vital is to discuss about the targets in the beginning of the projects because getting the project started is the most important thing of the collaboration. Startup F also see that large firm and startup have own objectives too and those should hardly not be discussed. In addition, some companies in this study share the opinion that as long as a good partner is found, no discussion is needed because it is clear that the collaboration is better than no collaboration at all.

4.4.2. Sharing special know-how

According to interviews, sharing special know-how of the industry is essential in order to enhance the development of green product innovations. As highlighted also in the previous literature, sharing knowledge is essential for GPI development and it improves green dynamic capabilities which are needed when creating novel innovations. (Lin & Chen 2017; Rumanti et al. 2017; Dangelico 2016). Firm representatives acknowledge that large firms and startups have different kind of expertise and hereby, important is to combine experiences in order to succeed launching new green innovations. This is understood in large firms as well as in startups:

> *”We have the kind of know-how they don’t have and vice versa.” (Company C)*

When asking firm representatives what resources are needed in the development of ecological packages, they all agreed that there needs to be clear understanding of what they are developing as well as knowledge of the materials. Company B continues:

> *“[…] understanding of the materials: understanding of what the current materials are, but also understanding of what should be replaced. You need to have very good material knowledge.” (Company B)*

Hence, it would be beneficial to understand the industry where companies are developing novel innovations. According to Company B it is seen challenging that startups don’t have the specific industry knowledge of the industry they are applying its innovation. It is seen delaying the processes even though Company B understands that startups have limited resources and cannot thus have all the knowledge and here is the spot for large firm to bring its own expertise into the process. Large firms highlight that they have more understanding of the practical application of the industry needs and restrictions. There

seems to lie a contradiction in the opinions of startup and large firm's representatives. Large firms see that startups' knowledge of the product requirements and quality demands are inadequate whereas startups' representatives highlight their employees' experiences of previous industries they have worked in.

According to Usman & Vanhaverbeke (2017) if startup managers have previously worked in large firms, they understand the requirements of large firms and can thus better communicate and find solutions for a common project. Hence, startups in this study have formed their teams according to diverse expertise and are thus more capable of working within a specific industry with a large firm. For example, one of the Startup F's employee has experience from the forest sector and thus he is familiar with the bio industry and has already the contacts to the main actors within the industry that now produces all the materials needed for the startup. Startup E sees that they have already developed their innovation within different industries and thus, gained valuable experience within cosmetics and food markets. Even though their experience in that specific industry cannot be as good as large firms', startups are pioneers in the industry they operate in – in this case packaging. Packaging is in their expertise and that is the area they know all about.

> *"We have know-how that they [startups] don't have and long experience and they have young enthusiasm and some kind of own research background from their own area, which we instead don't have. They have their specific know-how and we have our own, which they need". (Company C)*

Thus, combining the experiences and know-how of large firms and startups related to specific industry knowledge is essential when developing green packaging innovations together. In this study, there seems to lie a slight gap between startups' and large firms' expectations towards understanding of the industry requirements which in turn hinder the development process of green product innovations. Startups concerned in this research have green innovations that can be applied in many industries and to many different products but if the knowledge of the industry remains incomplete, at least the launching of novel packaging innovations will be delayed according to interviews. Therefore, the collaboration between startups and large firms enhances the development of green product innovations if the specific industry knowledge is shared among the companies.

Related to specific knowledge startups and large firms have, it is vital that information between parties flow flawlessly. This is well understood among the case companies. In the literature, also Huang & Li (2017) state that open knowledge flow is essential when developing green product innovations and Ben Arfi et al. (2018) continues that firms are more capable of generating novel innovations when knowledge sharing is smooth and

open between the parties. Large firms in this study especially see that they have the responsibility to share their knowledge with startups they are collaborating with.

> *"With a startup, we need to teach them along the way – we need to explicitly and thoroughly advise what kind of research we must conduct, what kind of quality documents we need and what kind of audition system we have." (Company A)*

As company A above states, quality issues are more specific in large firms; they need to get several quality checking of the prototypes before the product even reaches production. This can take several months and on the opinion of a Company A, startups are necessarily not aware of all the research they must conduct before the process with novel innovation can be proceed. Therefore, it is vital to share information in a collaborative relationship because the innovation process is enhanced if everyone have the access to knowledge sources (Ben Arfi et al. 2018). All the large firms in this study highlight knowing the practices of certifications and tests when developing novel innovations. Startups in this study share the importance of certifications and tests with large firms and see the value of large firms' experience on this:

> *"[...] large firm is a player who has done packages for decades. [...] they have shared pre-information about what will work, what doesn't and how it could work" (Startup F)*

Thus, collaboration with large firms broadens startups' information base of needed certifications and tests for novel products before entering into the market. Without large firm's experience it would be more difficult to bring a qualified product into the market. However, startup E states that they have the skills and know-how inhouse related to certifications. According to representative of a startup E, this helps on ensuring the quality and requirements of a big brand.

According to interviews, it seems to be easier for large firms to share information than it is for a startup. Like the previous literature claims, startups might be afraid of losing their ideas for big companies (Hora et al. 2018; Weiblen & Chesbrough 2015). Also, the startups in this study tell that they are cautious of what kind of information they share with a large firm.

> *"Content of the patent or business secrets that are linked to the existence of our startup we don't open but till the specific limit. Those are the most important assets we have." (Startup E)*

One startup (Startup F) sees that information sharing works expect they sometimes have the feeling that for a big company collaborating with such a small startup it is only more like a hobby.

> *"The situation is like David and Goliath: many collaboration possibilities have been restricted the fact that we have chosen not to open everything we have and know." (Startup D)*

Large firms are well aware of the fact that startups need to protect their knowledge of the novel innovation but according to large firms, it does not have an effect on the development of green innovations. Transparency of information is also discussed during the interviews.

> *"[...] about development cooperation and go-to-market model we discuss very open because it is the foundation of creating a functional and amazing product into the market." (Startup E)*

Related to information sharing, importance of networks arises in the interviews among the firm representatives. It is seen important to build a network of different kind of professionals with whom to further build close relationships and eventually connect the networks in order to bring right actors together. This is in line with the previous literature, where it is argued that especially green innovations demand broad networks of different kind of actors (Dangelico 2016). Company representatives in this study agree on increasing competence within innovation creation by combining experiences and networks.

> *"We have definitely given startups something [connections] and we have also received something that we didn't have before." (Company B)*

> *"[...] out of the box ideas that are mind-blowing can come from totally different sources, for example from startups." (Company C)*

All in all, both startups and large firms share their opinion of the importance of two-sided knowledge transfer in developing green product innovations.

4.4.3. Innovativeness

During the interviews, the representatives were asked whether they see that startups are more innovative than large firms. This was asked because of in the chapter of motivational factors, innovativeness of startups got lot of attention. The previous literature claims that startups tend to be more innovative (Hogenhuis et al. 2016) but among large firms as well as startups it is not admitted that startups would be more innovative than large firms. Innovativeness is experienced more in the level of creating novel innovations but still not to understating the innovativeness of large firms.

> *"I would say that both [startups & large firms] are innovative but the progress of matters is easier in small firms." (Startup F)*

> *"Of course there comes so-called propeller head ideas, totally new and extraordinary. […] But if we are talking about ecological packaging innovations, those are also developed by large firms." (Company A)*

Large firms remind that startups are originally established around the novel innovation, but it doesn't mean that the idea will become in the existence without a support from a large firm.

> *"Often the first idea is something that doesn't fly. But in a collaboration with a large firm and fine-tuning and sparring we will get something great." (Company A)*

Even though startups are not more innovative according the interviews, it is acknowledged that startups have the passion and enthusiasm in business they do and especially the characteristics of the entrepreneurs are brought up during the interviews. Startups in this study have the desire to change the world to better place and their values are also greener. Large firms observe that entrepreneurs creating green packaging innovations seem to have self-interest in saving the oceans from pollution or other sustainability matters. Entrepreneurs' personal values support the idea of creating a product that is good for the planet states company B. This statement is great since if comparing the startup interviews to large firm interviews, startup representatives emphasize stronger their personal values towards sustainability and green thinking than large firms' representatives. The enthusiasm and eagerness to innovate green originate from the personal way of thinking which might have confused to innovativeness. According to interviews, innovativeness can be seen in many different ways and also startups interviewed cannot tell whether large or small firms are more innovative.

> *"Of course large corporations are developing greener things and I think it is great." (Startup E)*

Moreover, when asking large firms about the innovativeness, they all admire the passion startups have in their business.

> *"But the passion. Startups do everything with such a passion. That is something that you seldom see in large firms." (Company B)*

If the startups' enthusiasm and eagerness to innovate green might have confused to innovativeness, so is their passion to accomplish their tasks. According to interviews, large firms clearly admire the passion of the entrepreneurs and want to be part of it too through collaboration. Company B adds that maximum level of innovation can be reached through collaboration and thus, it is easier to innovate with a partner who has the passion to innovate. Therefore, through collaboration with passionate entrepreneurs the development of green product innovations will be enhanced.

4.4.4. Risk-taking capability

In order to enhance the collaboration between a startup and a large firm, big firms need to be ready to take risks. As Sandström and Tingström (2008) claim, mistakes and errors in the development process of green innovations is natural and should be accepted by both parties. Big firms in this study are conscious of the fact that collaboration with a startup involves high risks for them.

> *"[…] startups want to enter markets as fast as possible and they have less to lose because they are not big yet and they haven't deserved that much reputation either." (Company C)*

Despite the above comment Company C reminds that big companies have large market shares and if they make any false launch it will be expensive for the company. Other large companies agree on this too. On the other hand, according to the interviews, large firms have more resources to decentralized which means they can invest in something and if it won't be a success the whole business won't hurt. Also, according to Bos-Brouwers (2010), in large firms the innovation risks are averted by diversity in production, sales and innovation projects which disperses the financial risk. All the three large firms in this study are able to tolerate uncertainty and according to interviews this capability is needed when collaborating with a startup which is a new operator in the market and has not necessarily previous experience of the specific industry. Startup D summarizes well the different approaches to risks in large and small firms:

> *"The strategy in big firms tend to be "play not to lose" which means finding safe and proved solutions whereas startups' strategy is based on flexibility, quick changes and achieving profit through quick changes. Combining these logics is often the biggest challenge in collaboration." (Startup D)*

Startups interviewed for this study seems to be agile and their risk-taking capability is high. Startups have already taken the risk to invest in one innovation and they have put all their money for bringing it to the market. All the startup representatives highlight that their business exists particularly due to high risk-taking capability. However, according to Usman & Vanhaverbeke (2017) there is a risk of misappropriation of technology which may cause challenges for startups. During the interviews startup representatives were conscious of this risk and thus, they highlighted that they have patented their technology and that they do not share all the detailed information during the collaboration process – and only for protection purposes.

> *"We open our technology only to certain extent and this is well understood by a large brand." (Startup E)*

During the collaboration also some setbacks have emerged. For example, company A and startup E started collaborating in a mission to bring a fully biodegradable food packaging for one product into the market before Christmas. The interview with large firm A reveals that the product didn't make through till the appointed due date and now they have a new plan for developing a new product with green packaging. Also, the previous literature acknowledges the risk of delays when developing totally novel green product innovation in a collaboration. Timetables can be longer than expected but accepting the possibility for mistakes early on the R&D process, it encourages participants to be creative and innovative (Sandström & Tingström 2008). One large firm also saw collaborating with a startup a bit frightening in the beginning due to the small team behind a startup and the fact that anything could happen when launching new green products.

> *"[...] with a startup, we need to think a bit softer. For example, not to set too tight launching deadlines because you never know what could happen." (Company A)*

All in all, collaboration between startups and large firms enhances the development of green product innovations if both parties are aware of the risks and ready to shape their working habits into the more suitable form according to the situation. The risk-taking capability of startups thus encourages large firms to take risks.

5. CONCLUSION

The aim of the research was to examine the collaboration between large firms and startups related to green product innovations and especially novel packaging innovations in those Finnish firms that are developing green packaging innovations together. The topic is still very young among companies and only few packaging innovations have been launched to the market. However, the green mindset and interest in ecological packaging is in the hype among large firms and startups and the amount of green packaging is seen to raise quickly in the upcoming years both according to the interviews made as well as the previous literature (Melander 2018a; Huang & Li 2017; Dangelico & Pujari 2010).

The profound reason for studying this topic comes from the researcher's own interest towards more ecological packaging and moreover, the fact that the interest in green innovations has come up in the scientific literature only in the 21th century which tells about the topicality of the topic. And like the prior literature states, the movement towards sustainable development calls for innovation (Goodman et al. 2017) and especially consumer preferences are shaping the firms' strategies towards more balanced approach to both economic growth and environmental sustainability (Tang et al. 2018) and thus, green mindset among companies is driving them to invest and develop *green product innovations* (Melander 2018a; Huang & Li 2017; Dangelico & Pujari 2010). Previous studies in the field of collaborative GPI focus on the relations between suppliers and/or customers (Melander 2017) which creates a gap to investigate the collaboration with startups.

In recent years novel startups with the innovative business idea for greener packaging have been established which creates a perfect opportunity to research collaborative development of GPI among large firms and startups in the field of product packaging. Little research has also investigated the roles of dynamic capabilities and collaboration between startups and large firms within the development of green product innovations even though startups and large firms both have different kind of innovation capabilities that are needed for the successful development of green product innovations. All these factors form a clear research gap to the existing literature which is trying to be filled in this thesis. In order to obtain a comprehensive understanding of the phenomenon studied, this study applies three research objectives:

2) What are the motivators behind the interest towards green product innovations?

3) *What motivate**s** startups and large firms to collaborate with each other within the green product innovations?*

4) *What collaboration capabilities are needed in developing green product innovations?*

With the help of these three research questions this study finally answers to the main research question:

1) ***How collaboration between startups and large firms enhances the development of green packaging innovations?***

As a research strategy, an extensive case study is conducted which means that multiple cases were analyzed to study the phenomenon. The data for this study is gathered through theme interviews and a total of six Finnish companies participated in this study: three startups and three large firms. The firms were chosen based on their collaborative efforts towards green innovations in packaging. The interviews were conducted in November 2018 and the data analysis was conducted as a theory-bonded content analysis. Next the answers to the research question and objectives and thus, main findings of the study, are discussed. In addition, the framework built in the literature review is modified according to the main findings of the study.

5.1. Main findings of the study

Already from contacting the case firms' participants, they showed great interest towards green innovations and were eager to discuss about the opportunities collaborating is offering for them in the field of green product packaging. Company representatives claim that the common reasons for increasing green packaging or innovating green are consumer awareness, newly developed green innovations, and plastic waste boom. Greater awareness of the ocean plastic pollution impacts on the attitude towards plastic as packaging material among consumers. The green demand of the consumers is taken seriously, and companies are ready to develop new alternatives for plastics. Also, topics such as replacing, reducing and recycling emerge from the interviews. The pressure of social media is also acknowledged from the interviews to be a reason to innovate green because customers are demanding greener products.

If comparing these findings to the framework built according to the literature review, in addition to consumer awareness and customer green demand, such motivators are added to the framework: *newly developed green innovations, pressure of social media, trend of recycling* and *plastic waste boom.* The last two are also defined as the trends in packaging but however, are motivators for companies to innovate green. The factors of regulations, technological opportunities and economical perspective does not emerge as motivators to develop green innovations even though they are highlighted in the previous literature and thus, those three are not mentioned in the modified framework in the **Figure 4**.

Considering the motivation for collaboration among startups and large firms, large firms are impressed of the enthusiasm and working style of startups' employees and see that startup's green packaging innovation has the potential to answer the customer demands in the market. Therefore, the startups are seen to be in the forefront of the technological development and their novel business idea is seen attracting by the large firms. Moreover, collaborating with startups seem to be important for some large companies in this study and it is seen satisfying to help smaller Finnish companies to succeed. Startups, on the other hand are attracted by large firms' enormous resources, financial capability and experience of bringing novel products into the market. The scaling possibilities can be reached through the large firms and their large factories and production lines. Broad distribution channels and big brand name also attract startups to find collaboration partners among large firms. Hence, these capabilities of startups and large firms are seen attracting according to this study. These same capabilities also emerge in the previous literature. Thus, the modified framework is almost the same as it was in the theoretical framework presented in the chapter 2.4.2. concerning the startups' and large firm capabilities. Only the innovativeness of startups is replaced with enthusiasm and large firms' scaling possibilities are highlighted as well.

In addition to companies' own resources and capabilities, collaboration capabilities are vital in order the development of green product innovations to be successful. The findings from previous literature (Lin & Chen 2017; Lee & Min 2015; Hora et al. 2018; Usman & Vanhaverberke 2017) suggest green knowledge sharing, green R&D collaboration and common mindset of the project to be essential in collaborative development of green product innovations. The respondents, on the other hand, highlighted such collaboration capabilities as common interests, sharing special know-how, pursuing innovativeness and capability to take risks. Thus, the green R&D collaboration is not seen as important as it was according to previous literature and in addition, capabilities such as innovativeness and capability to take risks are added into the framework presented in the **Figure 4.**

Regarding common interests both startups as well as large firms agree on the importance of sharing clear goals and having the same vision of the project. However, some contradiction among startup and large firms' representatives appear whether the discussion of targets and objects is adequate or not. Furthermore, sharing special knowhow seems to play an essential role in developing novel green packaging solutions and especially the subject of industry knowledge emerges during the interviews. Large firms highlight the fact that novel green packaging innovations require specific industry knowledge which startups don't have own their own.

What comes to innovativeness the previous literature states (Hogenhuis et al. 2016) that startups tend to be more innovative but among the participants it is not admitted that startups would be more innovative than large firms. Rather the enthusiasm and eagerness to innovate green is confused to innovativeness. Startups have the passion and enthusiasm in the business they do, and innovating green originates more from the personal way of thinking. In addition, according to the interviews, large firms clearly admire the passion of the entrepreneurs and want to be part of it through collaboration. It is highlighted that it is easier to innovate with a partner who has the passion to innovate. Moreover, the risk-taking capability emerges from the interviews as an essential factor when collaborating with a startup and novel innovations. Large firms are aware of the fact that collaboration with a startup involves a high risk for them and like Sandström and Tingström (2008) claim, mistakes in the development process of green innovations are natural and this should be accepted by both parties. Large firms agree on this and are also aware of the fact that their whole business won't hurt even though any false launch would be expensive for the company. Startups highlight that their business exists particularly due to high risk-taking capability. Thus, collaborating enables the risk-taking capability which is needed when developing novel green packaging innovations.

By answering the three objectives above we can finally move on to the main research question of how collaboration between startups and large firms enhances the development of green packaging innovations. According to interviews, it is seen a clear asymmetric benefit in the collaboration among startups and large firms when developing novel green product innovations which refers to the fact that better innovation capability can be reached when the parties have diverse capabilities that complement each other. Regarding the innovation capabilities, both parties have diverse innovation capabilities that benefit in the development of novel green packaging innovations. Collaboration between startups and large firms enhance the development of green product packaging innovations because startups tend to have the novel innovations to replace plastic and big

brands have the capabilities of commercializing the green innovation into an actual package for consumers. Already Bos-Brouwers (2010) has investigated the capabilities of startups and large firms and by combining the capabilities, better innovation capability can be reached.

Therefore, in order to enhance the development of green packaging innovations different kinds of organization structures should be combined. The agile and creative environment of a startup is perfect for establishing new innovations and the experienced big brand has the capability to commercializing the startup's idea. Even though large companies are also seen as innovative according to participants the green innovations tend to come from startups where entrepreneurs' own values and interest towards green packaging drive the innovation capability. By collaborating with a large firm, it is possible to scale the startup's innovation and at the same time follow the requirements of the industry. This stands out especially in the food industry but also in others because consumer products tend to have high requirements and certificates to be completed before entering into the markets.

Startup employees' previous experience in large firms in the specific industry is seen as an advantage when later collaborating with a large firm. However, there still remains a slight gap between startups and large firms' expectations towards industry requirements. In addition, both parties see that large firms' experience of quality requirements and product testing is a huge advantage when developing together novel green product innovations. Information needs to flow flawlessly in order the collaboration be successful. However, knowledge sharing seems to be easier for a large firm who does not have the pressure of treasuring the core business idea behind the green innovation. Thus, the collaborative capabilities emerged according to interviews are sharing special knowhow, common interests as well as innovativeness and capability to take risks and those are presented in the middle of the modified framework in the Figure 4.

All in all, the agility of a startup combined with the experience and resources of a large firm forms a value that can be achieved through a great collaboration relationship. The **Figure 4** in the next page presents the modified framework built according to the results found from the interviews and analysis made.

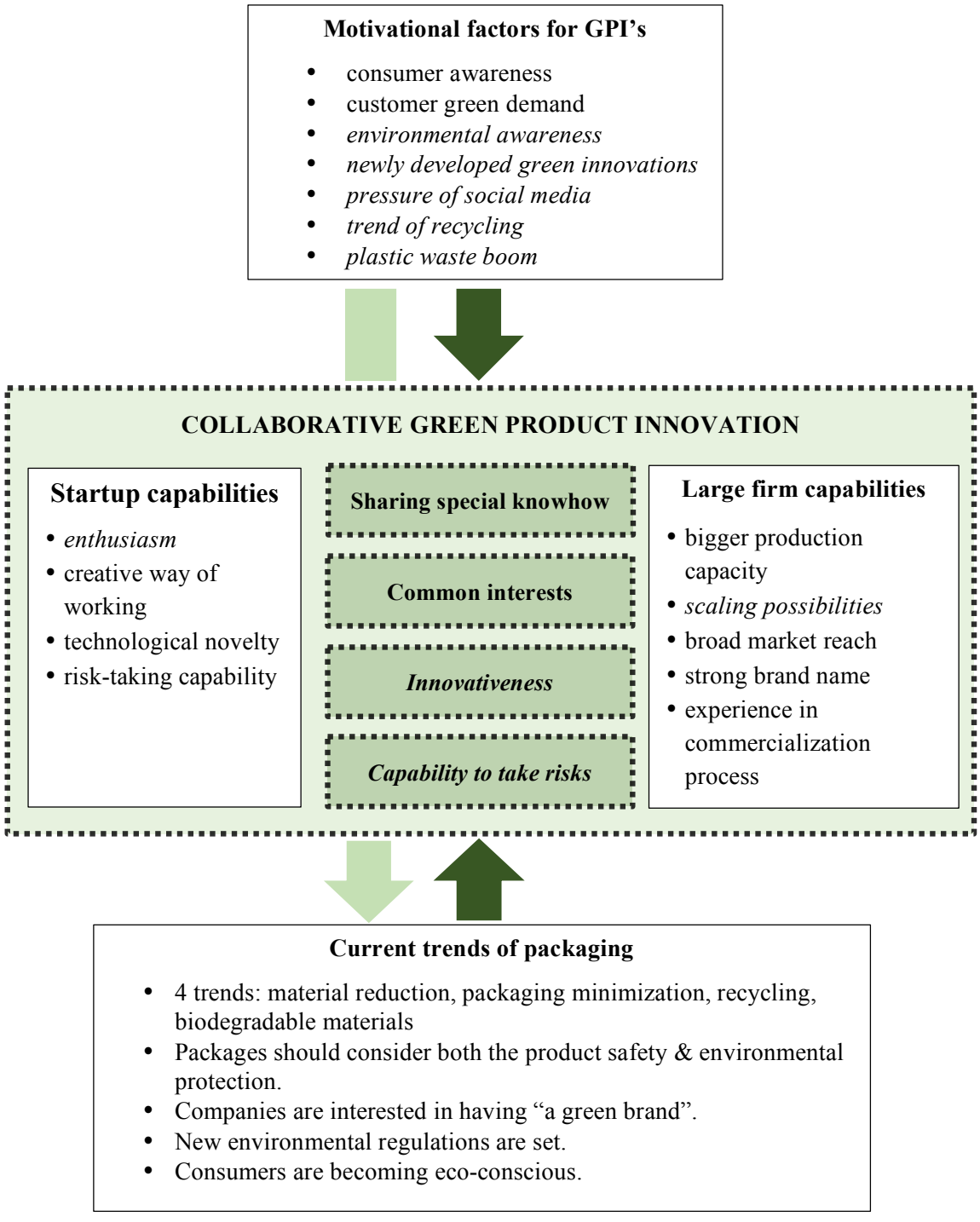

Figure 4. Modified framework according to findings

5.2. Theoretical and managerial contribution of the research

In terms of theoretical contributions, this thesis develops a theoretical framework for collaborative GPI among startups and large firms in the field of packaging. The framework can be applied in other industries if the box "current trends of packaging" is switched to another topical trend. The previous research remains scarce what comes to investigating the collaboration especially with startups in the field of green product innovations in packaging. Therefore, this study contributes to the existing research on collaborative development of green product innovations among startups and large firms by giving an overview of the phenomenon and acts as a good starting point for further research. Moreover, this study shows that customer green demand is an important factor for companies to develop novel innovations in product packaging. The role of legislative pressure was not considered that significant as the previous literature states (Melander 2017; Dangelico 2016) rather the push to innovate green comes from the side of a customer. Thus, this research challenges the current focus on legislative changes in product packaging and emphasizes to concentrate more on the customer perspective and their green demand in the future research.

Related to the managerial contributions of this study, this study provides directions for companies to embrace collaboration within the field of green packaging. Management of large companies in particular should put their focus more on what are the current trends of product packaging and how existing innovations could be utilized in their product packaging. Moreover, companies need to develop practices, hire skilled personnel and invest in technology and R&D that support collaborative green innovation. In addition, if the company determines to collaborate with a startup, it is suggested that firms invest in knowledge management practices in order to ensure the knowledge flow among the parties.

5.3. Limitations of the study and suggestions for further research

This study has several limitations. The focus was on startup and large firm collaboration in GPI. Other collaboration partners such as suppliers, universities, research institutes, customers could also have been studied. In addition, generalizations from this study are limited as the research consisted of six case companies. However, the aim of this study is to obtain a deeper understanding about the phenomenon of collaborative GPI

development among startups and large firms in the field of packaging and for that purpose this study rather gives an overview of the phenomenon than produces generalized results.

As highlighted by Kong et al. (2016) green innovation research is in its early phases and how to enhance green innovation is a scarcely understood phenomenon and thus, it would be useful to study more about the factors that enhance green innovations itself. In addition, this research focused on green innovations in packaging as general and the focus was not on one specific industry rather this study gave an overview of how the green innovations in packaging could be enhanced through collaboration. The limited amount of green packaging innovations in Finnish firms restricted the research and thus, the scope of the study remains narrow. However, in the future new innovations will be developed and the area of green packaging innovations will evolve which broadens the research area. In addition, the future research could examine the motivational factors among large firms that do not yet consider green packaging that relevant in their operations.

Research related to startup and large firm collaboration in green packaging development will evolve and possibilities to study how to reinvent more green technologies to replace plastics will open up. In the future, more focus should be on investigating collaboration with startups because their agile organizational structure and enthusiasm of entrepreneurs allows the development of novel green innovations. Moreover, the subject of recycling also emerged during the interviews and thus, the future research could examine how to build more functional plastic recycling system that could be applied faster in a national level. Furthermore, this thesis built a framework which can be applied in other context in addition to packaging and in order to find answers to better recyclability of the products, the framework could be applied in other topics in circular economy. For example, high-tech startups developing robots who will make the recycling process more automatic or companies who are solving the problems related to bio waste problems and its recyclability. With the help of the framework large companies and startups could find wider range of opportunities to create solutions to hinder the climate change and answer the green demand globally.

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APPENDIX 1. Guiding outline for theme interviews

The purpose of the research:

The aim of this study is to examine the importance of collaboration when developing green product innovations. The focus of this study is on the green packaging innovations and collaboration, more precisely on the relationship between startups and large firms. The main research question of this study is how collaboration between startups and large firms enhances the development of green packaging innovations.

1) **Green innovations**
   - Do you think the use of ecological packaging will increase in the future? What about the interest of big companies related to green packaging?
   - What kind of packaging innovations you are developing in the collaboration with a large firm/startup?

2) **Motivation to collaborate**
   - Why did you see large firm/startup as potential collaboration partner?
   - How did the collaboration start?

3) **Resources**
   - What resources are needed when developing novel ecological packages?
   - What resources big companies/startups have that you don't have?
   - What resources you believe large firms/startups want from you?
   - Do you see here a potential match among startups and large companies which should also be concerned with other firms when thinking about developing novel green innovations for packages?

4) **Capabilities**
   - What factors are important in order the collaboration works with large firm/startup? Does it differ from collaboration with other partners?
   - Do you think startups are more innovative than large firms if considering green innovations?
   - Do you think that you have better capabilities to answer customer demand in green markets when you collaborate with a large firm/startup?

5) Development process

- Do you feel that you have same goals with large firm/startup? Have you discussed about those before the collaboration?
- Do you feel the information sharing works between you?
- Is the knowledge sharing transparent?
- What kind of atmosphere you have in common meetings?
- Do you have common R&D processes?
- Do you work in the same location?

6) Additional questions

- About collaboration with different industries?
- How do you see the packages in 10 years?